BAKER "Yardloader" ...has 4 forward speeds

This rugged 4000-lb. capacity pneumatic-tired, gas-powered fork truck is the lowest priced in its class. Yet it has many features enabling it to do a greater variety of jobs, faster and more efficiently, than higher priced machines.

For example: *four* forward speeds give it faster acceleration, faster "cycling", faster delivery on long hauls, better ramp operation and better traction on uneven, soft or slippery surfaces. Add to this the advantages of its large (7.50 x 16) hi-flotation drive tires, higher ground clearance, greater stability (55-inch wheelbase, 41-inch wheel tread), top forward speed of 13.88 miles per hour—and it's not hard to see why "YARDLOADER" is setting new performance records on in and out-of-doors jobs.

All this at a low cost permitting savings up to $500 and more on initial investment! Write for descriptive bulletin 1345-A. The Baker-Raulang Company, 1251 West 80th Street, Cleveland, Ohio.

Baker.
handling equipment

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'ROUND ABOUT with the editors in field and office

Edited by R. L. Marinello

Personnel Changes at Avisco

W. Edwards Dungan was recently promoted to plant manager at American Viscose Corporation's Roanoke, Virginia, rayon plant. He was chief plant engineer until his promotion and will be succeeded in that post by **William H. Kreamer,** formerly assistant chief plant engineer.

Prior to joining American Viscose Corp. as chief design engineer, Mr. Dungan was with General Electric Co. for 12 years. He went to Roanoke in 1951 as assistant chief plant engineer and was made chief plant engineer in 1952.

Mr. Kreamer was associated with General Electric Co. before joining American Viscose Corp. in 1940 as a staff engineer. He worked at the corporation's Meadville and Lewistown, Pa., plants before being made assistant chief plant engineer at Roanoke in 1947, a position he held until his recent promotion.

Looking for a Plant Engineer?

IF YOU ARE, maybe this is the man who will fit your requirements. He has had experience as a chief plant and production engineer for a metal working plant. Prior to this, he was employed in the automobile industry, serving in such capacities as: chief tool engineer, senior layout engineer and product designer.

In another position he assumed the duties of works manager and was responsible for all production, inventory, personnel, production engineering and time study.

In addition to a mechanical engineering education, he has attended courses in production management, covering such subjects as: accounting, cost analysis, time study, industrial engineering and production processes and methods.

Any one interested in getting more information about this plant engineer should write to The Editor, PLANT ENGINEERING, 110 S. Dearborn St., Chicago, Il

Thulium X-Ray Unit

THE U. S. Atomic Energy Commission will assist private industry in the commercial development of portable thulium x-ray units. Development of the unit by the Argonne National Laboratory near Lemont, Illinois, was announced last spring. (An article about this unit, "Thulium X-ray for $40.00," appeared in June, 1954 issue of PLANT ENGINEERING.) AEC assistance will consist of:

1. Non-radioactive thulium will be irradiated in the Materials Testing Reactor at the AEC's National Reactor Testing Station in Idaho and elsewhere. Cost of the unirradiated material will be approximately $10 per unit of 200 milligrams, and cost of irradiation will be approximately $100 per unit.

2. Argonne National Laboratory will make available on a loan basis to industries, a limited number of thulium radiation sources in aluminum capsules. A charges of $50 will be made for each three-month loan of the activated source.

3. Argonne will make available on a loan basis a limited number of assembled thulium x-ray units to qualified industrial firms and non-profit institutions for developmental studies and for experimental field applications in research and medicine. Loans will be for a maximum period of three months, and a service charge of $100 will be made for each loan plus a deposit of $300. The entire unit is approximately six inches in diameter, seven inches long and weighs about 20 lb.

A fact sheet on the unit has been prepared for use by interested firms and this fact sheet and any additional information may be obtained by writing to Technical Services Division, Chicago Operations Office, U. S. Atomic Energy Commission, P. O. Box 59, Lemont, Ill.

Motion and Time Study Course

WASHINGTON UNIVERSITY'S Department of Industrial Engineering is presenting a Motion and Time Study Intensive Course from June 8 through June 17. This course provides a basic introduction to Motion and Time Study.

Material covered will be presented with emphasis on setting up correct methods.

Objectives of the course will be to prepare the attendee to (1) apply motion and time study in his own organization and (2) train others in his company in the principles of motion and time study.

For further information concerning course content, instructors and registration, write to Dr. Gerald Nadler, Department of Industrial Engineering, Washington University, St. Louis 5, Missouri.

Materials Handling Conference

CONFERENCES ON materials handling techniques, conducted by the engineers who use the equipment, will be held in conjunction with the National Materials Handling Exposition at the International Amphitheatre in Chicago, from May 16 to 20.

The Chicago section of the American

Subscriptions: U.S.A. $10, Canada $11. Other countries $12 per year. Single copies $1. Change of Address: Send to PLANT ENGINEERING, Circulation Division, Barrington, Illinois. Please supply position title, company name, company address. Request must reach us by 15th of month to make the change effective with following month's issue. Published monthly and accepted as controlled circulation publication at Chicago, Ill.

For heat exchangers and condensers . . .

COLD DRAWN WROUGHT IRON TUBING

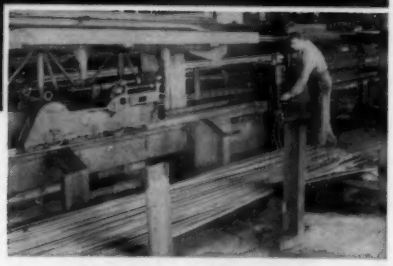
Here's your answer to *extra life* in tubing services. Cold drawn wrought iron tubing—because its composition and structure are the same as wrought iron pipe—provides the same time-proved protection against corrosion and fatigue failure. This longer service life advantage, combined with precise tolerances, make cold drawn tubing ideal for:

- **ammonia condensers**
- **heat exchangers**
- **pre-heaters**
- **gas cooling apparatus**
- **gasoline condensers**
- **evaporators**
- **cooling pipe and steam condensers**
- **salt and brine lines in air conditioning services**

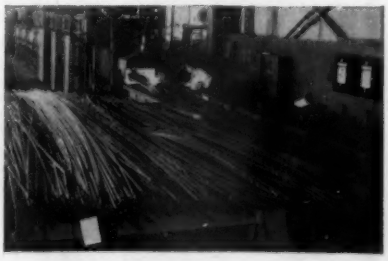
The ability of cold drawn wrought iron tubing to reduce the frequency of repair or replacement in these and similar services is amply supported by actual service records.

You'll find it profitable to investigate cold drawn wrought iron tubing for your particular installation. We will be happy to discuss your needs. Just write or call.

A. M. Byers Company, Pittsburgh, Pa. Established in 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Department: New York, N.Y. *Available throughout the world.*



"Drawing" process—mandrel controls inside diameter and die reduces outside diameter as tubing is drawn. Interior and exterior of tubing are smoothed in process.



Annealing process restores ductility of the tubing. Ring gauge is then used to check OD, followed by a micrometer reading for wall thickness.

BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY STEEL PRODUCTS

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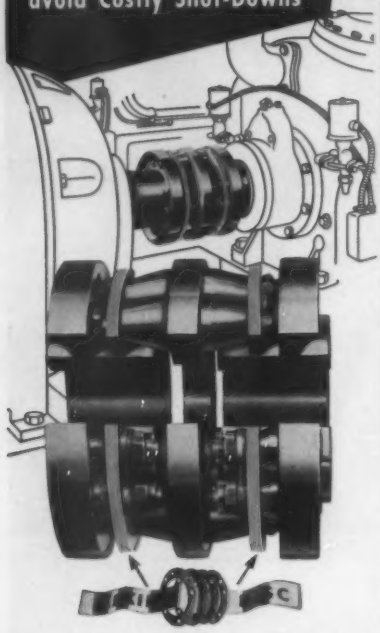
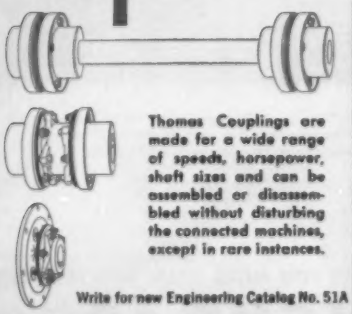
Specify THOMAS ALL METAL
FLEXIBLE COUPLINGS
for Power Transmission to avoid Costly Shut-Downs



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower, shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

For more facts circle 504 on Reply Card

'ROUND ABOUT

Materials Handling Society will act as host and will prepare the program. D. A. Gillespie, society president, has appointed L. J. Riege, materials handling engineer, United States Gypsum Co., Chicago, as chairman of the conference.

This conference is planned to offer industrial users of materials handling equipment, the widest possible knowledge of the field. The exposition will permit them to view actual equipment in use.

Advance registration cards for the exposition may be obtained by writing to Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y., or writing "Materials Handling Exposition" at the bottom of the postcard in this issue.

Additional Data on Power Tools

PLANT ENGINEERING has received a number of requests from readers asking for tear sheets of the article "Portable Power Tools," which appeared in our February, 1955 issue, for distribution in the plant.

We would like to call your attention to several changes and additions which should be included with the various testing instructions mentioned in this article.

Instructions pertaining to illustrations 1 and 2 from the top of page 87 should include: Before test, touch probe on lead with light to good ground. Plug position in 115 v power source is correct if light goes on. If not, change plug position, try again. For test, do not hold tool or place it on grounded surface.

Illustration 3 instructions should include: The same information as above with the exception of the last sentence.

Instructions pertaining to illustration 4 should include: Then touch the probes one to each of the other terminals in turn. If the light goes on both times, the polarized terminal is a power terminal, and should not be used for grounding a single phase unit. If the light goes on only once, the polarized terminal may be used for grounding a single phase unit.

Of course, instead of using the 115 v power source, several 1½ v dry cells can be tied together in series with a bell for the test purposes.

Preventive Maintenance Course—from Manufacturer to User

AN EXPERIMENTAL training school in preventive maintenance and theory of operation, conducted recently, may solve one of the most vexing problems plaguing industry today—how to reduce the cost, in manpower, time and money, of maintenance and repairs of plant equipment.

Cooperators in the venture are the Samuel M. Langston Co., Camden, New Jersey, supplier of machinery to the corrugated container industry, and The Hinde & Dauch Paper Co., Sandusky, Ohio, manufacturer of corrugated boxes.

For the experiment, Langston provided the plant facilities for classroom and shop instruction and the skilled instructors from its own operating personnel. Hinde & Dauch supplied the students.

Reports from Langston's field engineers convinced them that there were four basic practices around which a good program of preventive maintenance and proper operating theory could be built. These are: 1. Proper indoctrination of operating personnel; 2. Proper adjustment of each job; 3. Periodic inspection; and 4. Proper and periodic lubrication.

The experimental course of instruction used for the Hinde & Dauch employees was designed with these points in mind. The two-week course consisted of shop instruction in proper machine operation, adjustment and a review of vital parts, as well as classroom sessions where diagrams and sketches were used in lectures to emphasize important points.

Features of a Langston corrugator are described to group of production and maintenance personnel taking the two-week intensive preventive maintenance course

For easier and better pipe hanging!

This adjustable swivel hanger attached to a concrete insert is easy to install and will safely carry a wide range of loads. Like all Grinnell Hangers, it permits easy adjustment at any time after pipe is installed . . . to prevent sagging pipe and water traps, and to assure positive drainage. This is just *one* of the ways Grinnell Engineered Pipe Hangers save you maintenance expense, give you a better installation.

A good piping job is too important to jeopardize with improvised or inadequate pipe hangers and supports. There's a Grinnell Hanger for every piping requirement. All Grinnell Hangers comply with piping code specifications.

CB-UNIVERSAL CONCRETE INSERT (Fig. 282) . . . Used for pipe lines up to 12 inches where sizes of hanger rods cannot be readily determined in advance of ceiling construction. This insert is cast in one body size only. V-type teeth grip a special removable nut which is ordered separately and can be furnished tapped for 3/8", 1/2", 5/8", 3/4" or 7/8" hanger rods. Face of insert can be concealed by ceiling finish.

ADJUSTABLE SWIVEL PIPE RING (Fig. 101) . . . Solid ring of malleable iron. Twelve sizes provide load range of 80 lbs. for 3/4" size, to 1510 lbs. for 8" size.

LOCKING SWIVEL SHANK of Fig. 101 Pipe Ring . . . To obtain proper adjustment, swivel shank can be turned easily by hand when the weight of the pipe is temporarily taken off the ring. When weight is returned, swivel shank locks automatically, preventing change of adjustment due to vibration. Wire retaining ring keeps swivel shank and pipe ring or yoke from separating, makes assembly a single unit.

GRINNELL

AMERICA'S #1 SUPPLIER OF PIPE HANGERS AND SUPPORTS

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports Thermolier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems

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For more facts circle 506 on Reply Card ⟶

OFF CENTER WEIGHT--

didn't damage bearings

---RUN AT FULL SPEED-
in this R&M motor!

They're still in perfect condition because they're ***extra large***

No motor bearing was ever submitted to a tougher test! We mounted a five-pound weight—2 inches off-center—on the shaft of a standard R & M "All-Weather" Motor, then turned on the switch. As you can imagine, that motor practically turned handsprings with over 1,000 pounds of centrifugal force being placed on the bearings. It must be recognized also that this is all side-strain on the bearings. After twelve solid hours of this punishment, the R & M bearings were found to be in perfect condition!

Here's a dramatic example that shows how extra-large, fully sealed R & M bearings pay off in rugged service. By "extra large" we mean bigger diameter than you usually find in a motor bearing . . . double-row race width . . . bigger balls that withstand greater load.

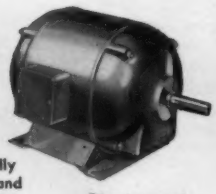
You'd never treat a motor this way, of course. But, *in terms of years of service*, a bearing with stamina like this is a bearing you can *forget*. We build oversize bearings into all R & M "All-Weather" Motors—*at no extra cost to you*—as just one more precaution against any chance of failure later on.

From 1 to 125 Horsepower . . .

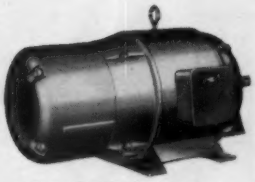
if it's an R & M, it's the Right Motor!

Frequency converters and alternators, 2½ to 15 kw.

Explosion-proof totally enclosed fan-cooled and chemical plant motors 1 to 40 hp.



Direct current motors 1 to 7½ hp.



Capacitor single-phase motors 1 to 7½ hp.

ROBBINS & MYERS, INC.

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Mail the coupon today—for more information on the finest motor your money can buy!

Robbins & Myers, Inc.
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Please send illustrated Integral Horsepower Motor Catalog, showing all the extra features of R & M "All-Weather" Motors that are furnished at a standard motor price. We are also interested in:

- ☐ Explosion-Proof Motors
- ☐ Totally Enclosed Fan-Cooled Motors
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"All-Weather" is an R & M trademark

Philadelphia Ore Dock –lubricated with

Gulf Sales Engineer A. L. Sears looks over a portion of the 100 tons of equipment that make up the clamshell bucket turntable and man trolley drive. Gulf E.P. Lubricants and Gulf Precision Grease protect the gear drives and bearings.

A view from the weigh hopper down the conveyors to the unloading towers. The cargo of a waiting ore boat is being speedily unloaded.

Facilities

GULF QUALITY OILS *and* GREASES—

speed ore from new mines to mills

THE PENNSYLVANIA RAILROAD'S new ore dock, on the Delaware River near Philadelphia, can unload at one time any two of the largest ships carrying ore from the new mines in South America, Africa, and Labrador. After unloading, the ore is conveyed up to the weigh hopper and then is loaded into rail cars for rapid shipment to various steel mills.

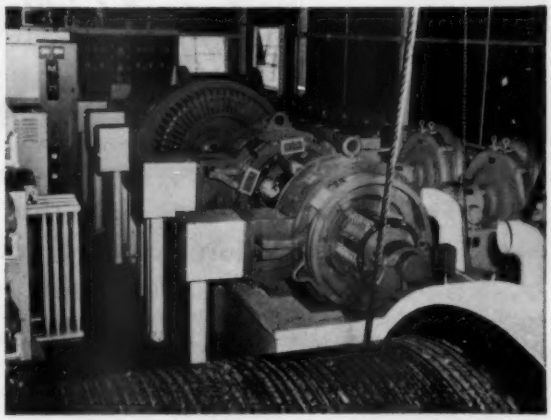
Gulf quality oils and greases provide the vital lubrication so necessary for smooth, continuous operation of this important facility.

Gulf E.P. Lubricants protect the drives in the unloading tower, conveyor belts, and bucket turntable. The bearings of all the motor-generator sets in the unloading tower are lubricated by Gulf Harmony Oil; the boom hoist and clamshell bucket cables by Gulf Lubcote; the belt drum and drum shaft bearings by Gulf Precision Grease; and Gulf High Pressure Grease keeps the 5000 conveyor belt idler bearings operating smoothly.

These are but a few of the hundreds of petroleum products Gulf makes available to fit your every need. Each fuel and lubricant has been developed by Gulf technologists to insure better performance of equipment and lower operating costs.

Make sure you are getting the advantages of all recent developments in petroleum science. Contact your nearest Gulf office today and have a Sales Engineer call.

The control room of the unloading tower with the boom hoist cable in the foreground. Gulf Harmony Oil and Gulf Lubcote protect the motor-generator bearings and boom hoist lines respectively.



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No costly maintenance problem here

Used as siding for this recently completed building, Johns-Manville Corrugated Transite will provide years of durable service and fire safety with a minimum of care. It needs no paint or special treatment to preserve it.

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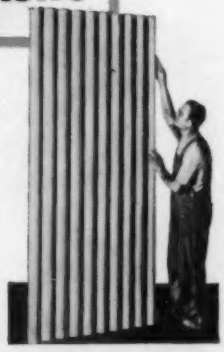
For maintenance-free exterior walls and roofs, plus protection from fire, rot and weather

YOU SAVE MONEY on construction and maintenance when you build with Johns-Manville Corrugated Transite®. Corrugated Transite comes in large sheets that require a minimum of framing . . . permits fast economical construction of maintenance-free industrial, commercial, institutional and agricultural buildings.

Made of asbestos and cement, Corrugated Transite is practically indestructible. It never needs paint or special treatment to preserve it . . . it's fireproof, rotproof and weatherproof. Corrugated Transite is also used increasingly for smart interiors . . . the streamlined corrugations and attractive shadow lines that give it such unusual architectural appeal for exteriors offer unlimited interior design possibilities.

Investigate Johns-Manville Corrugated Asbestos Transite and learn how you can build quickly and easily . . . have an attractive, long-lasting, trouble-free structure regardless of size or purpose. For complete details write Johns-Manville, Box 158, Dept. PE, New York 16, New York. In Canada write 565 Lakeshore Road East, Port Credit, Ontario.



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- Easy to fasten to steel
- Easy to nail to wood
- Easy to saw
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Johns-Manville

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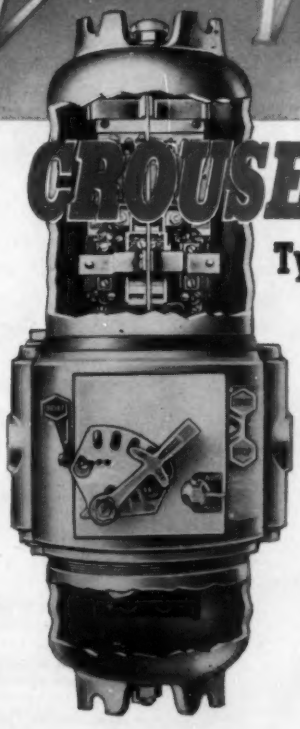
Need more motor controls BUT... haven't enough room?

33 – count them – 33 Crouse-Hinds' combination starters and circuit breakers . . . space for 2 more for later installation . . . plus 2 circuit breakers –all in 28' x 10' of space! Conventional single-tiered installation would have required 20 ft. - longer rack and 4 more junction boxes.



CROUSE-HINDS

Type EPC Explosion-Proof MOTOR STARTER and CIRCUIT BREAKER

CONDULETS* take up less space!

As in the installation shown above, a given area will hold *more* Crouse-Hinds' motor controls than any other make. You save money on the construction of steel mounting racks – fill your needs without occupying additional premium floor space.

- Explosion-proof, dust-tight, weather-resistant.
- Light-weight cast aluminum for easy installation without lifting equipment.
- Flame-tight threaded joints throughout.
- Seven conduit entrances simplify installation.
- Built-in push button stations and built-in selector switch available.
- Starter sizes 0 to 5. Circuit breakers 50 to 600-amp. frame sizes.

Let Crouse-Hinds help you solve your space problems.
Engineering assistance available without obligation.

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CONDULETS • FLOODLIGHTS • TRAFFIC SIGNALS • AIRPORT LIGHTING

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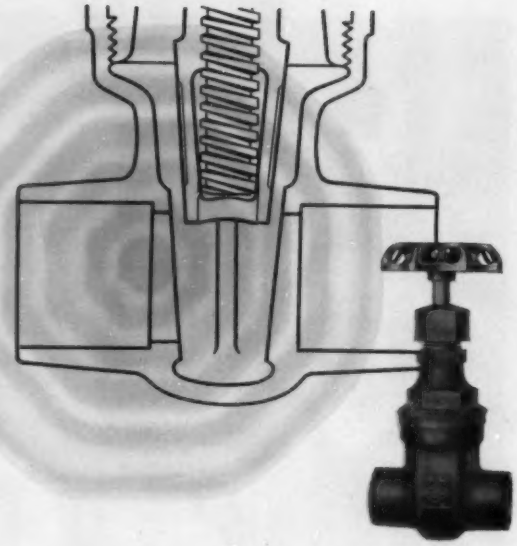
you need the extra strength of

JENKINS

Solder and Socket End

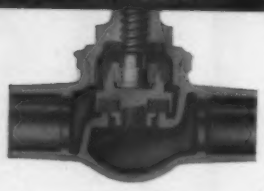
VALVES



Solder End GLOBES and ANGLES

300 lbs. O.W.G.
¼" to 3"

Fitted with Renewable Composition Disc.



Solder End GATES

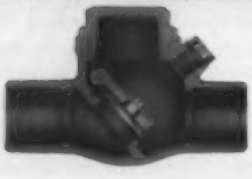
225 lb. and 300 lb. O.W.G.
⅜" to 3"

With solid or split wedges, and stationary or traveling spindles.

Solder End CHECKS

300 lbs. O.W.G.
¼" to 3"

Regrinding. May be easily reground without removal from line.



NEW BULLETIN Lists all Jenkins Solder End and Socket End Valves and gives complete instructions for soldering and brazing. Ask for Solder-Socket End booklet.

The "light-duty" look of copper tubing installations is deceiving. Valves must provide an accurate fit to tubing and *hold it* under the intense heat of soldering. And, because flexible tubing does not afford the rigid support of standard pipe, valves must withstand unusual strains in operation.

Jenkins Solder End Valves are engineered to meet these demands with strength to spare. High tensile bronze castings have liberal dimensions for extra rigidity. Smooth, clean bores assure accurate fit, easy soldering, positive seal to types K, L, and M Copper Tubing.

For faster, trouble-free installation, and lasting economy, specify Jenkins Solder End Valves. Jenkins Bros., 100 Park Ave., New York 17.

JENKINS Socket End Valves

for Class B or IPS Tubing

Jenkins bronze valves with socket ends for silver-brazing are made in Globe, Gate, and Swing Check patterns to control compressed air, hot oil, and similar fluids in tubing hookups where specifications call for permanent, leakproof joints. Complete information in the Bulletin offered below.

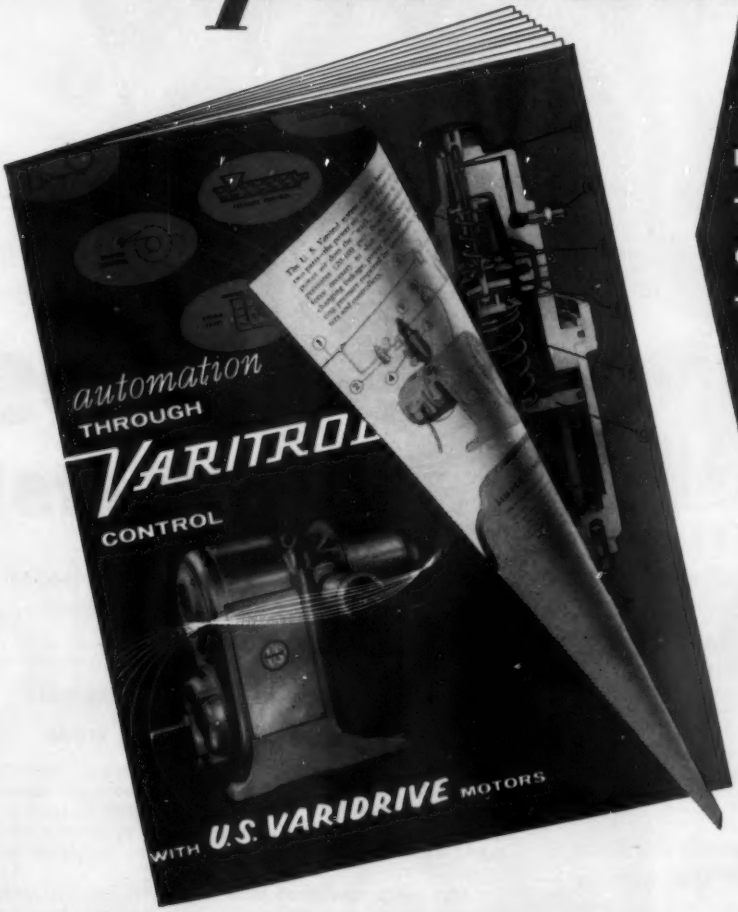
JENKINS
LOOK FOR THE JENKINS DIAMOND
VALVES
SINCE 1864 TRADE JENKINS MARK
Jenkins Bros.

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS

For more facts circle 510 on Reply Card

Free! THIS BRAND NEW BOOKLET ABOUT

automatic speed control



HOW TO APPLY THE ADVANTAGES OF VARIABLE SPEED TO AUTOMATION

Typical applications of Varitrol pneumatic control regulating the speed of Varidrives in response to a signal from such variables as temperature, humidity, pressure, speed, liquid level, weight and tension are dramatically pictured and explained in this full-color booklet. How the Varitrol pneumatic system functions is illustrated with full-color cross-section drawings and diaphanous views of the U. S. Varidrive with exclusive right angle speed-changing linkage. This educational booklet, edited by variable speed engineers, is your guide to a method of greater production of more goods and services at lower cost and astounding man-hour savings. Write today for your complimentary copy.

U. S. ELECTRICAL MOTORS, Inc.
Los Angeles 54, Calif. • Milford, Conn.

U. S. VARIDRIVE

WITH VARITROL®
FOR VARIABLE SPEED AUTOMATION

US MOTORS

REQUEST FOR VARITROL BULLETIN

U. S. ELECTRICAL MOTORS, Inc. PLE-4
P.O. Box 2058, Los Angeles 54, Calif., or Milford, Conn.
☐ Send Varitrol Automation Booklet No. 1882
☐ Send U. S. Varidrive Booklet No. 1797

Name_____
Company_____
Address_____
City_____ Zone____ State_____

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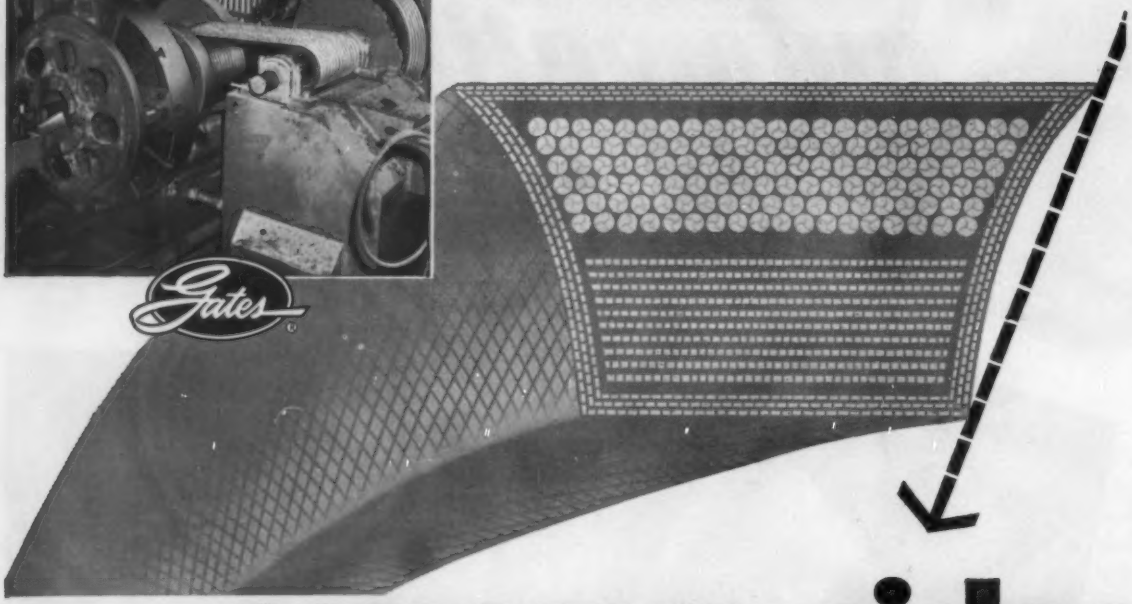
The smooth, positive flow of power transmitted through Gates Vulco Ropes enables this large engine lathe to handle quickly and efficiently many tough oil field repair jobs.



How concave sides cut V-belt costs!

Plants all over the world have made this discovery: Gates Vulco Ropes—the V-belts with *concave sides*—wear longer; cost less per year of service.

Here is the interesting reason why:

When the Gates Vulco Rope is bent around the sheave, the *precisely engineered* concave sides (Fig. 1) fill out and become straight (Fig. 1-A). Thus the belt makes full, uniform contact with the sides of the pulley. You get sure pulling power and *even distribution of wear.*

Longer wear saves not only on replacement costs; it also saves the cost of down-time... keeps equipment producing.

It's easy to prove to yourself the value of concave sides

Simply bend a straight-sided belt (Fig. 2) and *feel* the bulge at the sides around the bend. You will quickly see why the bulging sides prevent an even fit in the pulley groove (Fig. 2-A). Uneven contact shortens belt life...increases belt costs.

Cut belt replacement time and costs...specify Gates Vulco Ropes—the V-Belt with *concave sides* (U.S. Pat. 1813698). The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-Belts.*

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

7PA-30-A-C

GATES VULCO ROPE DRIVES

For more facts circle 512 on Reply Card

IT'S LYON 5 TO 1

● ***The votes of key men in companies throughout the country speak volumes for Lyon. For these men gave Lyon five times more first choice votes than the second highest manufacturer! And twice as many as the next twelve combined!***

A nationally known research company compiled these figures when they asked key men in 5,000 companies this question:

"If your company were in the market for steel equipment such as steel shelving, lockers, work benches, shop boxes, etc., what manufacturers would you consider?"

Your nearest Lyon Dealer offers the world's *most diversified* and *most preferred* line of quality steel equipment. (A few are shown below.) Equally important, he can show you how to get the most out of steel equipment in terms of time, space and money.

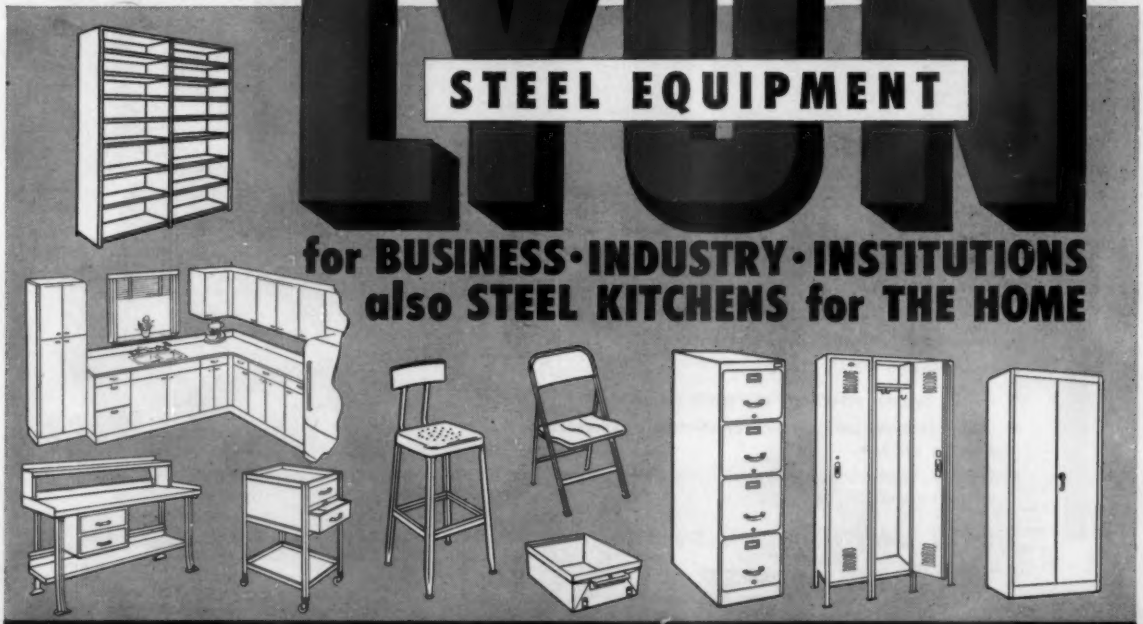
LYON METAL PRODUCTS, INC.
General Offices: 491 Monroe Ave., Aurora, Ill.
Factories in Aurora, Ill. and York, Pa.
Dealers and Branches in All Principal Cities

Lyon also has complete facilities for manufacturing special items to your specifications.

LYON®

STEEL EQUIPMENT

for BUSINESS • INDUSTRY • INSTITUTIONS
also STEEL KITCHENS for THE HOME



A PARTIAL LIST OF LYON STANDARD PRODUCTS

• Shelving	• Kitchen Cabinets	• Tool Toters	• New Freedom Kitchens	• Flat Drawer Files	• Folding Chairs	• Service Carts	• Tool Stands
• Lockers	• Cabinet Benches	• Bar Racks	• Display Equipment	• Revolving Bins	• Coat Racks	• Sorting Files	• Shop Boxes
• Stools	• Storage Cabinets	• Tool Boxes	• Toolroom Equipment	• Filing Cabinets	• Work Benches	• Drawer Units	• Tool Trays
• Bin Units	• Drawing Tables	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks

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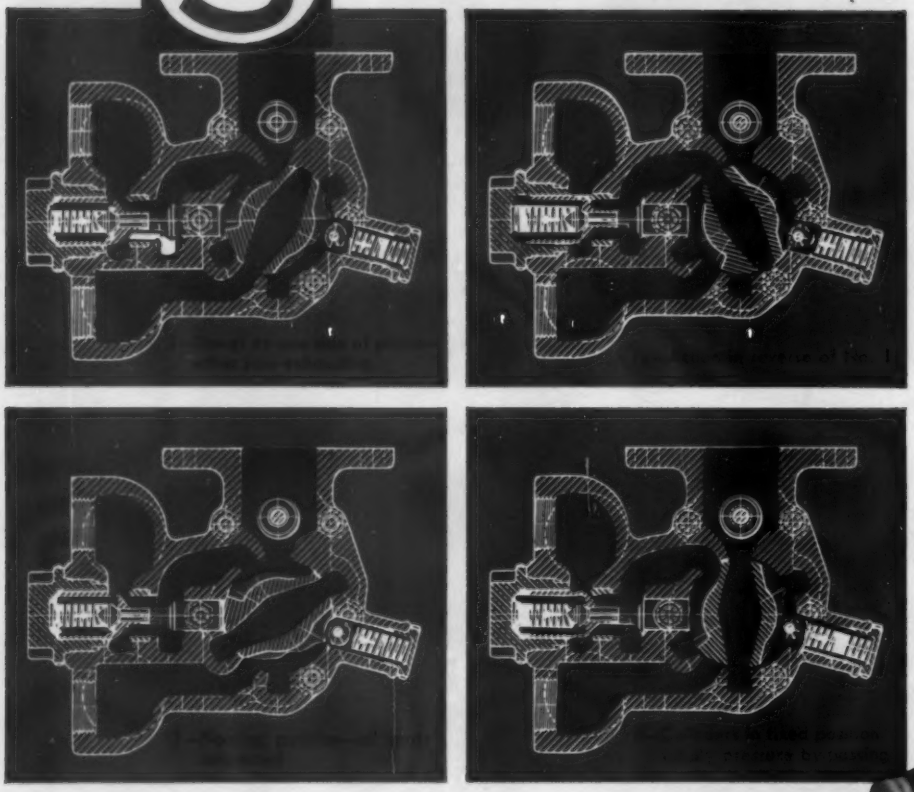
CASH STANDARD

TYPE 555-RO

Four-Way Hydraulic Operating Valve

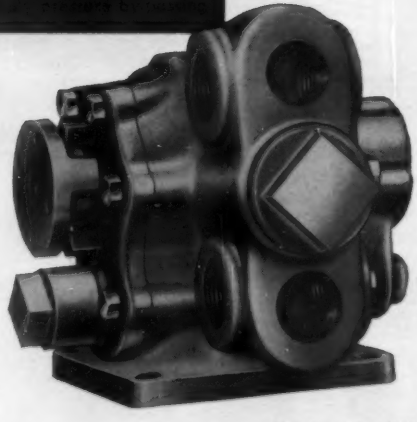


a unique rotor actuating hydraulic valve with full floating position

A Single Unit For Actuating Hydraulic Equipment

- Actuates one to three hydraulic cylinders
- Designed for 300-1500 psi pressures
- Capacity 400 GPM at 1500 psi
- Built-in by-pass effectively minimizes piston creep
- Design features ball-bearing construction and hardened wearing surfaces
- Rugged construction and precision machining assures easy operation and long service

WRITE today for Bulletin S-600



U. S. Patent No. 2360987

CASH STANDARD

A. W. CASH COMPANY, P. O. Box 551, Decatur, Illinois

Pressure, Hydraulic, Temperature, Process and Combustion Controls

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B.F.Goodrich

FREE TW TIRE AND WHEEL ANALYSIS can solve your tire problems, reduce costs 20-50%

The B. F. Goodrich Tire and Wheel Analysis Plan has reduced industrial tire costs 20 to 50% for hundreds of users across the country. It has solved seemingly hopeless cases of abnormal tread wear and premature failures. The B. F. Goodrich TW Analysis can help you cut your tire costs. Contact your local BFG retailer or mail the coupon below. Without cost or obligation a trained B. F. Goodrich man will study your materials handling operations.

The TW man will tell you what type and size tires, what tread design and compound will serve you best. He will recommend ways to improve your tire maintenance program. The advice you receive will be unbiased, for B. F. Goodrich makes a *complete* line of industrial tires. A special TW Analysis is available for manufacturers of industrial hauling equipment.

Heavy equipment and loads? Overloaded tires fail prematurely. Let BFG show you how to properly match tire and load. Make sure you are using the correct inflation pressures for pneumatics.

Avoid tire failures like this. The tire pictured here failed prematurely. BFG's TW Analysis helps you discover the reasons for tire failure, prevents reoccurrences, saves you tire dollars.

Without cost or obligation. The TW man is an expert. His free analysis of your materials handling operations can help you cut tire and tire maintenance expense.

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Please send me:
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- ☐ Free copy of "Industrial Tire Guidebook"
- ☐ Free copy of "How to Get Extra Service out of Solid Industrial Tires"

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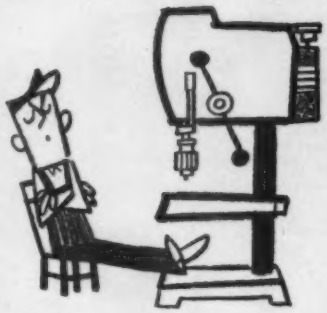
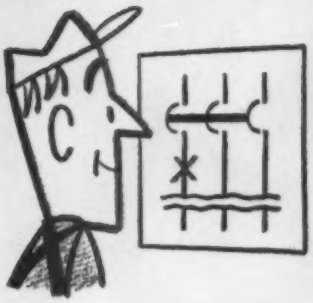
10 reasons why it's wise to buy

1 They offer the highest degree of personnel protection. Live parts are covered, even when enclosure cover is open.

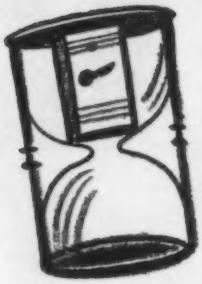


2 They reduce production downtime. No time is lost locating or replacing fuses. Breaker can be reset as soon as fault is cleared.

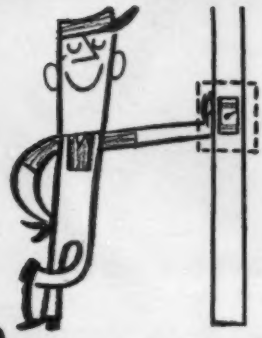
3 They eliminate replacement costs and maintenance. First cost is the last. No replacement parts or fuses are needed.



6 They prevent possible single phasing when a fault occurs. All poles trip simultaneously.



7 They safely carry continuous current rating indefinitely. Breakers must carry 100% of load indefinitely without exceeding temperature limits.

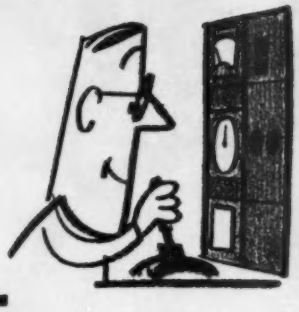


8 They save mounting space. Require less space than same rated enclosed fusible switch.

Nema 1 Enclosure | "F" Frame Breaker | Nema 1A Enclosure | "KL" Frame Breaker | Nema 7 Enclosure

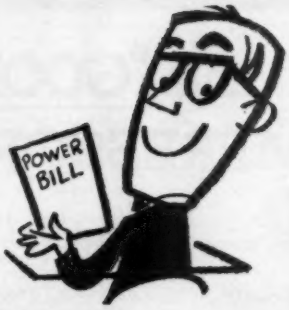
I-T-E Circuit Breaker Protection

4 They are completely tamperproof. Breaker is calibrated and sealed at the factory.



5 They are twice-tested individually at the factory to insure uniformity of operation in the field.

9 They can be equipped with internally mounted auxiliary devices for under-voltage protection, remote tripping and indication of circuit condition.



10 They incur low watts loss. Welded connections and silver alloy contacts provide low watts loss throughout the life of the breaker.

I-T-E Molded Case Circuit Breakers are rated through 600 volts a-c, 250 volts d-c, 10 through 600 amp. I-T-E also supplies a complete line of enclosures for all applications. Contact your I-T-E representative or authorized distributor for the Speedfax Catalog. Or write Small Air Circuit Breaker Division, I-T-E Circuit Breaker Company, 19th and Hamilton Sts., Philadelphia 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY • Small Air Circuit Breaker Division

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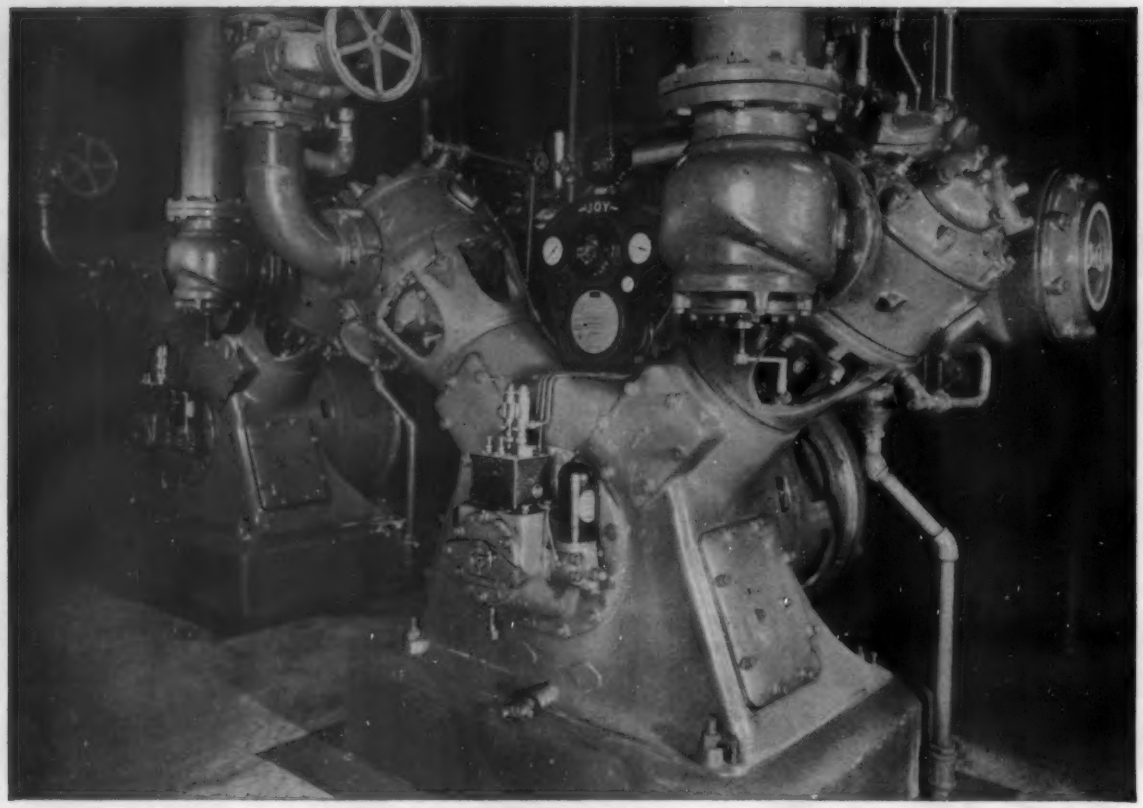

The Case of the "GOOD AS NEW" COMPRESSORS

These two Joy WN-112 air compressors were used for several years in really heavy-duty operation under extremely tough conditions.

They were installed at different times . . . the newest about four years ago. Plant personnel report that, with nothing more than customary plant maintenance, they are still "good as new" and still furnishing, without shutdowns, the air to keep the plant in operation.

Durability and easy maintenance are built-in features of Joy WN-112 compressors. Cylinder and crosshead liners are field-replaceable, and made of alloy iron, honed to a mirror finish. Large area, low lift Joy "Dual Cushion" valves are set at the most efficient angle in both heads. Lubrication is by force-feed to all moving parts with automatic shut-off protection.

The Joy WN-112 is a heavy-duty, continuous service, two-stage, double-acting compressor of V-vertical design. It is normally powered by a flange-mounted motor but is adaptable to diesel, steam turbine, flexible coupling, V-belt or flat belt drive. It is a versatile machine and a compact space-saver in any plant.

For complete details on the Joy WN-112, write for Bulletin A-62 to ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario*

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Consult a Joy Engineer

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JOY

SPECIALISTS IN THE COMPRESSION AND MOVEMENT OF AIR AND GASES SINCE 1885

For more facts circle 517 on Reply Card

BULLETINS just released and of immediate plant interest

CONSTRUCTION

101 Aluminum in Architecture—This 32-pp booklet provides information on use of aluminum, and of special interest is a discussion on architectural colors for aluminum exterior surfaces. Also describes basic types of aluminum finishes—satin, sandblast, bright, and "as fabricated." There are drawings and details of copings and gravel stops; curtain wall products, including facings, panel assemblies and wall units; industrial roofing and siding, weatherside and underside fasteners; trim and molding; sheet, plate, foil, pipe, rod and bar stocks; and structural shapes. An alloy section lists mechanical properties of applicable alloys. Aluminum Co. of America.

102 Acoustical Materials—Included in this 16-pp 1955 catalog on acoustical materials is information on several types of Celotex: cane fiber tile; an incombustible mineral fiber tile; an incombustible metal tile. Text covers their sound absorption, fire resistance, moisture resistance, washability, impact resistance, and sizes available. Also presents a suspension system and a lock board. Also provided in this booklet are sample specifications for acoustical treatment, installation data and sound absorption coefficients. The Celotex Corp.

103 For Timber Fabrication—Essentials of wood roof truss construction are detailed in this 12-pp bulletin, and two basic methods of truss fabrication—preassembly and prefabrication—are described and illustrated. Although these methods apply primarily to roof trusses and similar types of wood framing with Teco wedge-fit split rings and shear plates, the procedure applies to most other structural framing. Methods for erecting timber trusses and tightening joints are also described, and wood connectors are illustrated. Timber Engineering Co.

104 Double-Purpose Material—Technical information on Marinite, a structurally strong sheet material which both builds and insulates is contained in this 16-pp illustrated bulletin. There are handling and working recommendations; construction and fabrication suggestions; data on physical and thermal properties; and photos showing how material is used to advantage by textile, food, plastics, appliance, electronics, petroleum industries. Johns-Manville.

105 Grating and Stair Treads — Bulletin 1105, 16-pp, describes chief construction features of company's grating and stair treads. Photos and detail sketches illustrate various styles available as well as typical installations and applications. Information on serrated grating, armoring and flooring is included. A series of tables list grating weights, standard sizes of safety stair treads, panel widths, and safe bearing loads for various bearing-bar spacings. Diagrams explain typical fastening devices, and how they are applied to hold grating panels secure. Specifications included. Dravo Corp.

106 Ceiling Diffusers—Catalog F 6597, 28-pp, contains information on ceiling diffusers, and ceiling returns. The square and rectangular ceiling diffusers and returns are designed to match appearance of acoustical ceiling tile and provide an inconspicuous means of air distribution. Linear ceiling diffusers can be used for either supply or return air, with or without integral fluorescent light units. Catalog includes dimension drawings, ordering information, typical installations, and performance data. Barber-Colman Co.

107 For Translucent Ceilings—This 8-pp engineering report features technical data on a formulation of rigid cololymer vinyl chloride now optional in company's translucent ceilings. The report includes product standards, dimensional data, a table of coefficients of light utilization, and provisions of company's three-year warranty. The F. W. Wakefield Brass Co.

108 Electrified Floors—How to have electrical outlets where you need them is told in this 16-pp booklet on electrified concrete joist floors. Stresses economy, flexibility, weight elimination and fire resistance features of these floors. Explains how standard ducts are buried in structural concrete, shows installation procedure. Also provides information on system design and includes cost comparison data. Concrete Reinforcing Steel Institute.

109 Improved Tension Bolt — Mechanical properties of this manufacturer's new Hi-Ti titanium tension bolt are given in this technical bulletin. Also includes fatigue test data on this new fastener which, although much lighter in weight than a comparable steel bolt, is claimed to have higher endurance strength and only slightly less tensile strength. Photos illustrate test data. Standard Pressed Steel Co.

MATERIALS HANDLING

110 Materials Handling Equipment—Recent advances in construction and design of company's fork lift trucks are featured in this 20-pp illustrated bulletin. Describes special operating features and lists advantages. Technical data on the heavy duty industrial engines are included, as well as information on interchangeability of parts. Various models in the "FT" series (capacities to 7,500 lb), the "FB" series (capacities to 2,000 lb), and platform trucks are described and dimensions tabulated. Buda Div., Allis-Chalmers Mfg. Co.

111 Lift Trucks, Skids—Several new designs in hydraulic and mechanical lift trucks are presented in Catalog LT854, 16 pp. In addition to covering company's standard Weld-Bilt truck and skid line, booklet also shows spring-suspended hydraulic lift trucks, low-priced single stroke pallet trucks, hydraulic lift tables, skid adapters and other equipment. Fully illustrated with photos of models, brief text covers features and optional equipment. West Bend Equipment Corp.

112 Facts About Fork Trucks—This folder presents a study of capabilities of gasoline and electric powered fork trucks operating under normal conditions. Contains 12 "fact sheets"—plus 2 industrial truck maintenance report forms which enable you to keep an accurate breakdown of labor, parts and power costs for both gasoline and electric trucks. These sheets are a digest of information published by users and manufacturers of trucks. They answer many of the questions about cost, dependability, service life and the relative merits of gasoline and electric power. Lewis-Shepard Products, Inc.

113 Power Industrial Trucks — This 8-pp condensed catalog covers company's line of power industrial trucks, including Elpar fork trucks, high and low lift platform trucks, and crane trucks. Each type is detailed in a separate section with photos of individual models. Catalog also contains data on specially designed vehicles for specific operating requirements. Pictures and data on various attachments are also included. The Elwell-Parker Electric Co.

114 Crane and Hoist Parts — Bulletin G8 cover's company's line of hoist grabs, as well as component parts for various type cranes. Includes photos and drawings of the parts, along with descriptions and specifications. Downs Crane & Hoist Co.

115 Lifters for Many Jobs—Included in Catalog 55 are 40 pp of pictures and useful information on this company's line of materials handling and overhead service machines. Provides application information and specifications on Shoplifters, Worklifters, elevating tables, and trucks. Also includes a section devoted to drum racks, and another on company's Hi-Reach telescopers. Economy Engineering Co.

On pages 213-214 are two postage-free Reader Service Cards provided for your convenience in ordering these bulletins. You may also use the cards to order any literature mentioned in ads.

116 Pneumatic Tube System—This booklet describes a prefabricated pneumatic tube system, suggests a variety of arrangements for installing the equipment in any type of building, and lists components furnished in the "kit." Also provides instructions for laying out and installing the double-tube system, including plan and side-view drawings. Lamson Corp.

117 Adjustable Ramps—Engineering details and other information on use and installation of company's hydraulic adjustable ramps for loading docks are featured in this illustrated bulletin. Two types of dock equipment are treated—the Adjust-A-Dock, installed in the loading platform or at its level, and the Adjust-A-Truck, installed at ground level to raise or lower rear wheels of truck. Rowe Methods, Inc.

118 Live Storage Rack—How this manufacturer's Flow Rack works, where it's used and some of its advantages are presented in 28-pp Form FRB 55. Benefits are discussed in terms of receiving, storage, inventory control, assembly, stock rotation, order selection, maintenance, damage control, other factors. Gives information on installation of the Flow Rack—a combination of steel rack storage uprights and cross members and conveyor wheels or rollers in longitudinal rails—set with a pitch so that anything in the rack moves forward as the item ahead of it is removed. The Rapids-Standard Co., Inc.

119 Chemical Handling and Storage—Bulletin MMM2, 24-pp, features storage and handling machinery for chemicals. Describes storage machines used in a variety of installations and contains layout drawings and photos of interest to those with materials handling problems. The brochure shows how company develops storage systems to meet needs of the bulk chemicals industry and works with plant engineers to fit scraper storage into building plans. Basic chemicals and corrosion are discussed briefly. Sauerman Bros., Inc.

120 Shelving, Storage Equipment — This small, 24-pp catalog provides ordering information on a wide range of steel shelving and lockers and other storage and maintenance equipment. Tucked in among the many items cataloged are cartoons and a joke column. Precision Equipment Co.

121 Improved Storage Tanks—Bulletin 916 introduces the Utilitank, glassed inside and out for the storage of neutral products where non-contamination, ease of cleaning, and non-adhesion are of importance. Tells features, advantages offered and lists products for which it is suitable for storing at room temperatures. Explains construction of the tank, gives specifications and sizes. The Pfaudler Co.

MECHANICAL POWER TRANSMISSION

123 Parallel Shaft Gear Drives—Book 2619, 32-pp, describes parallel shaft gear drives, listing 39 standard size drives for the vibration-free transfer of power, together with baseplates and built-in backstops. Includes complete engineering data, simplified horsepower tables, dimensions, and overhung load capacities for the selection of standard parallel shaft drives. Link-Belt Co.

124 Gear Products Guide — This 200-pp catalog lists specifications and prices of over 8,000 stock items, including gears, sprockets, chains and splines. Considerable space is devoted to company's drilling units, dust collectors, coolant systems, grinders, and other related items. Manufacturing facilities of company are pictorially treated and catalog is illustrated with photos, diagrams, and charts. Services available for designing and building of tools, dies, etc. are noted. Universal Gear Works, Inc.

125 Eddy-Current Brakes — Standard units in both air and liquid cooled eddy-current brakes are described in illustrated 12-pp Bulletin BR-1. Points out chief advantages and describes operation and mechanical construction. Application data and specifications are included, as well as capacities. Dynamatic Div., Eaton Mfg. Co.

ELECTRICAL

126 Electric Motors — Twenty types of company's motors are shown in 8-pp Bulletin 1878. Illustrated in natural color, bulletin con-

BULLETINS

(Begins on page 21)

tains descriptions of Uniclosed, totally-enclosed, explosion-proof, Varidrive, Syncrogear, combination variable speed and internally geared units, right-angle worm gear, and other types. Cut-away views of Varidrive and Syncrogear types are shown, and details on AutoStart buffers, right-angle hollowshaft gear drive for turbine pumps, and lubrication are included. U. S. Electrical Motors, Inc.

127 Enclosed Motors — This 12-pp illustrated information booklet points out 100 characteristic facts of company's totally-protected a-c motors. Included is a classification of the significant points common to all of company's a-c motors, with a further breakdown of information specifically on protected and enclosed motors. Contains facts on fan-cooled, corrosion-proof, and explosion-proof designs. Reliance Electric & Engineering Co.

128 Unit Substations—How compact, enclosureless packaged power at load centers effects installation and operating economies, while stepping-up production and providing for future load demands, is explained in 16-pp Bulletin 102 on unit substations. Illustrates and describes units on platforms, balconies, basements, outdoors and in production areas. High voltage section equipment, transformers, and low voltage switchgear are also shown. Outdoor "Weather-Loc" construction is described. A fold-out section illustrates high voltage, transformer and lower voltage sections as they would be combined to form the unit substation. Continental Electric Equipment Co.

129 Rubber-Insulated Cable — Bulletin 1090, 36-pp, describes company's rubber-insulated cable constructions, a cost-saving cable design for use in racks or trays for applications where rigid conduit systems are unnecessary or undesirable. Cable with insulation may be operated at conductor temperatures to 85 C both indoors and outdoors at voltages to 15 kv. Current carrying capacities, dimensions, installations and handling techniques, splicing and terminating drawings and instructions and fittings are included. The Okonite Co.

130 Power for Business Machines—Bulletin 47 describes a 60-amp overhead trolley busway electrification system well suited in installations of business machines. Shows how this system eliminates costly rewiring when relocating of machines, reduces maintenance costs, affords other benefits. Feedrail Corp.

131 Guide to Instrument Transformers—The 1955 edition of this instrument transformer buyer's guide, 100-pp Bulletin GEC-1028, contains basic information on company's complete line. Fully illustrated, book contains ratings, ASA accuracy classifications, and prices of all standard indoor and outdoor potential and current transformers. Listings of ratio and phase-angle tests, tables of replacement types, and mechanical and thermal data are included. Designed to save time in selecting and ordering current transformers, potential transformers, and metering outfits, this book supplies pertinent data on all standard types that conform to ASA insulation standards. Available to qualified plant engineers. General Electric Co.

Reader Service Cards for ordering bulletins are on pages 213-214. Be sure to include your name, job title, and company.

132 Improved Cable Trough — Sixteen-pp Bulletin 67A introduces a standard cable trough with built-in coupler, designed to ease and speed installation of cable and reduce number of parts necessary to join trough sections and fittings. Tells application for this improved cable trough in utilities and in industries. Gives data on the basic unit, elbows, tees, reducers, Y branches, other fittings, and barrier strips. Also provided in booklet are tracing templates and load deflection data. T. J. Cope, Inc.

133 Test Instruments—This series of data sheets describes company's portable high current test units for safely checking and calibrating electrically actuated protective devices. Information on recommended uses, electrical ratings, component equipment and physical dimensions is included, together with illustrations of each standard model. Multi-Amp Corp.

LIGHTING, COMMUNICATION

134 Lighting Unit Standards—A complete compilation of new RLM Specifications is presented in the 48-pp 1955 edition of this authoritative booklet. Covers 46 different types and sizes of incandescent and fluorescent industrial lighting units. In addition, booklet explains reasons for the standards, discusses the basis for the specifications and the objectives of the manufacturers participating in the RLM Inspection and Certification Service. RLM Standards Institute, Inc.

135 Mercury Lamp Transformers — Bulletin 551-5, 16-pp, gives detailed information on transformers and fuses used in mercury lamp outdoor lighting, and lists advantages of this type of lighting. General information, lamp data, diagrams and illustrations on transformers for both multiple and series circuits are given. Along with installation data, catalog features information on company's constant wattage transformers. Jefferson Electric Co.

136 Radio Control Systems—Information on how two-way radio can make materials handling more efficient is presented in this 10-pp illustrated bulletin. Shows how radio control saves equipment, manpower, floor space, and production time. Also includes general technical information on radio control systems. Provides case histories giving details on use of two-way radio. Radio Corp. of America.

137 Inside Telephone System—How the installation of an inside telephone system solved common communications problems in one plant is told in illustrated Circular 1764. Lists chief advantages of system, tells what it accomplishes in facilitating plant operations. Photos of typical applications are included. Automatic Electric Sales Corp.

138 Television Housings — Catalog Sheet E.55 describes two special housings developed for use with company's industrial television equipment. Features and specifications for the explosion proof housing and for the weather-proof housing are included. Engineering Products Div. Radio Corp. of America.

INSTRUMENTS, CONTROLS

139 Pneumatic Control, Transmission System—Application and operation of pneumatic control and transmission systems are discussed in 46-pp Bulletin 1120. Also covers pneumatic transmission systems and cascades, ratio and other interconnected control systems. Besides design data, bulletin contains practical information on how to tune pneumatic controllers to a process, how to introduce manual adjustments, and how to provide best air supply. Industrial Div., Minneapolis-Honeywell Regulator Co.

140 Liquid Level Control—Bulletin L-119 introduces a control for use primarily with boilers to 250 psi, but applicable to many types of liquid level regulation. Explains how it is used to control a boiler feed pump from the boiler water level, provide a lower water fuel cut-off, close an electrical circuit for operating an alarm. Magnetic switching principle is discussed and illustrated, and installation data included. McDonnell & Miller, Inc.

141 For Flow Measurement — Information on company's line of Rotameters is presented in illustrated 20-pp Bulletin 115. Includes descriptions of side plate construction and safety features, flow capacity charts, details of design and construction, dimension drawings, tube and float material and design data, various modifications of standard meters and full line of accessory equipment. Brooks Rotameter Co.

142 Automatic Proportioning System — A proportioning system that permits remote dialing of individual ingredient weights is pictured and described in 28-pp Bulletin 0351. Besides explaining how the Select-O-Weigh system works, bulletin details installations in remote proportioning of oil shale, cement formulating, blending of feeds, net weighing with automatic tare compensation, differential weighing, glass batching, other operations. Photos and engineering drawings illustrate installations. Design characteristics explained. Richardson Scale Co.

143 Speed, Production Recorder — Sixteen-pp Bulletin 541 describes company's Tetco Type R-500 recorder, which makes permanent records of any machine speed or production rate while counting units of production. Profusely illustrated, bulletin includes typical charts calibrated in varied units such as revolutions per minute. Case histories show how recorder functions in several applications. The Electric Tachometer Corp.

Among Recently Published Literature of Merit . . .

144 Thin Curtain Walls—Use of Foamglas in thin wall and sandwich panel construction is detailed in this 12-pp booklet. Besides giving advantages of this cellular glass insulation for such construction, booklet contains photos and information on projects utilizing this technique. Fabrication and job data accompany each project. Covers porcelain enamel panels, aluminum and stainless steel facings, concrete panels and spandrel construction. Also included is a summary of an accelerated aging test of an architectural panel, as well as typical installation details. Pittsburgh Corning Corp.

145 Liquid Level Control Systems—Bulletin 1161, 24-pp, includes a discussion of basic principles of liquid level measurement, control, and transmission. Systems are described in detail along with applications, principles of operation, limitations and advantages. Various types of instrumentation are surveyed on a comparison basis. A tabulation of liquid level controlling and measuring systems records applications, components, principles of operation, ranges, limitations, advantages, and references to further data. Numerous diagrams supplement text. Minneapolis-Honeywell Regulator Co.

146 Pump Selection Data — Forty-pp Section K is devoted to engineering data on this manufacturer's line of rotary pumps. In it rotary pump fundamentals are explained in everyday language as an aid to proper selection and installation. A 10-step method for selecting the correct pump for the job is presented in detail, covering temperature considerations, materials of construction, horsepower requirements, determining pressure, determining size of discharge piping, mounting and drive arrangement, size of pump, determining viscosity of liquid, and determining capacity needed. Booklet also contains a section of useful engineering information. Viking Pump Co.

147 Industrial Safety Equipment—Designed as a safety manual, 65-pp Catalog 54 is divided into sections on eye protection, head protection, respiratory protection, and welding. Illustrations, descriptions, and ordering information are correlated. Discusses lens materials, frame dimensions and accessories, and offers information on safety spectacles. Technical data, such as transmission percentages and general specifications on various types of glass used in construction are included. Common dust, mist, fume, gas and vapor hazards are listed and proper respirator for each is shown. Willson Products, Inc.

148 Residual Fuel Oil Handling—A concise presentation on how to heat and handle heavy fuel oil for use in burners of boilers, furnaces and processing equipment is presented in 8-pp illustrated Bulletin 1601. A three-step procedure is detailed—heating the oil in the storage tank; heating the oil in the piping system, and heating the oil for burning. Preferred Utilities Mfg. Corp.

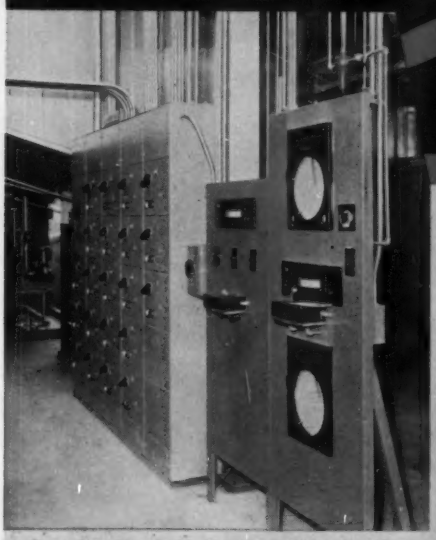
VALVES AND PIPING ACCESSORIES

150 Quantity Control Valves—Six-pp Bulletin OG 454 describes methods of industrial liquid metering with multistage quantity control valves, available in iron, steel, 316 stainless and bronze. Illustrates and describes meters, valves, registers and other equipment. Also features line drawings and descriptions of "typical hook-ups" recommended for specific metering applications. Performance curve and flow range charts are included. Meter and Valve Div., Rockwell Mfg. Co.

(More Bulletins on page 215)

COMPLETE *Finishing* SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH

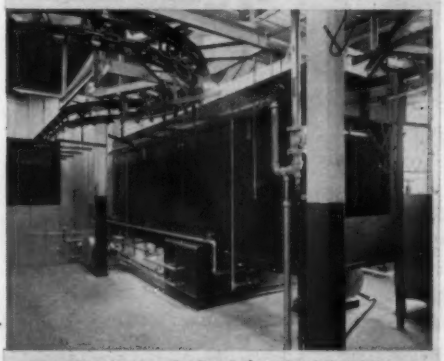


Control Station for the Complete Mahon Finishing System. All Starters and Electrical Controls are by General Electric Co.

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

View inside the enclosure which houses the Complete Mahon Finishing System installed in the General Purpose Control Department of the General Electric Plant, Bloomington, Illinois.

Mahon Open-Face Hydro-Filter Spray Booth designed to meet specific painting requirements of certain products in the General Purpose Control Department of the General Electric Company.



Mahon Flow-Coater and exit end of ventilated Flash-Off Area and Drip Zone. Part of the conveyorized system at General Electric.

GENERAL ELECTRIC CONTROL ENCLOSURES are Painted in a COMPLETE MAHON FINISHING SYSTEM!

Products of the General Purpose Control Department of General Electric Company, Bloomington, Illinois, now receive their fine finish in a completely new, highly efficient Mahon Finishing System. Facilities are provided for both continuous conveyorized processing and painting of normal units and individual handling of larger units. The continuous processing system includes a Five-Stage Metal Cleaning and Rust Proofing Machine, Dry-Off Oven, Cooling Tunnel, Flow-Coater, Flash-Off and Drip Zone Enclosure, and a Finish Baking Oven. Both Ovens and the Cooling Tunnel are located overhead. In addition to the conveyorized system, a Two-Stage Metal Washing Machine was provided together with an Open-Face Hydro-Filter Spray Booth and a Batch-Type Finish Baking Oven to handle unusually large units. Other equipment includes a Filtered Air Supply System and Stripping Facilities. The entire system is modern in every respect and is engineered into a surprisingly small area of floor space. If you are contemplating new finishing equipment, you, too, will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning, coordinating and engineering of equipment—which is the key to fine finishes at minimum cost. You will find also, that Mahon equipment is built better by Mahon for more economical operation over a longer period of time—a point which should receive your careful consideration when comparing initial costs. See Sweet's Plant Engineering File for information, or write for Catalog A-655.

THE R. C. MAHON COMPANY

HOME OFFICE and PLANT, Detroit 34, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

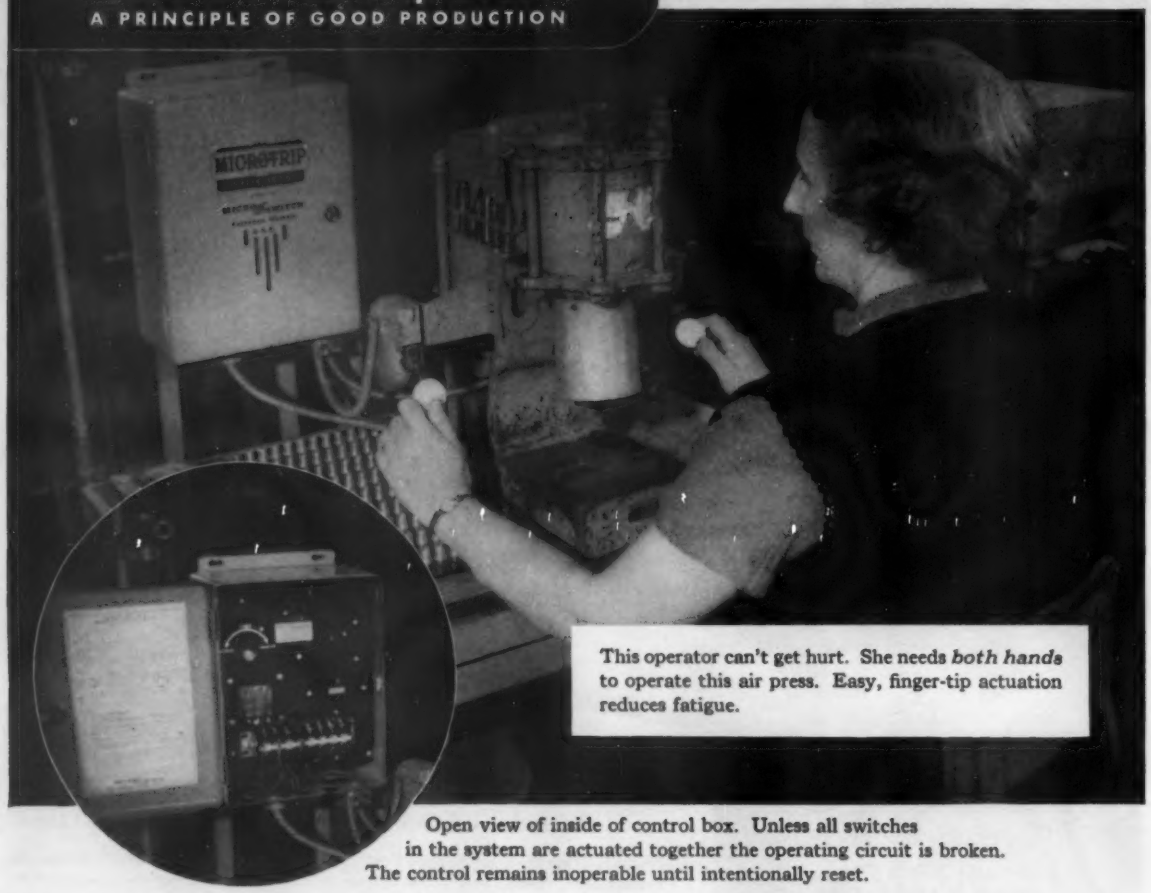
Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems and Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

For more facts circle 518 on Reply Card

MICRO SWITCH Trip Control

A PRINCIPLE OF GOOD PRODUCTION



This operator can't get hurt. She needs *both hands* to operate this air press. Easy, finger-tip actuation reduces fatigue.

Open view of inside of control box. Unless all switches in the system are actuated together the operating circuit is broken. The control remains inoperable until intentionally reset.

Here's a way to increase power press production up to 25%

• These three advantages of MICRO SWITCH Trip Controls mean increased production for your power machines:

1. Instantaneous electrical response. Increases number of operations in a given period.

2. Universal applications. (a) single stroke or repeat operation. (b) two hand or multiple station control. (c) automatic up-stroke or inch control for hydraulic, pneumatic or mechanical friction clutch presses.

3. Protection. Safe for operators and production set-up men. Cannot be "cheated." Any component failure or short circuit causes the control to become inoperable until corrected.

MICRO SWITCH Trip Controls can usually be used without additional equipment on machines equipped with solenoid or air cylinder clutch actuators. MICRO SWITCH provides complete package when other clutch actuating equipment is required.

Write for catalog and name of distributor nearest you.

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

FREEPORT, ILLINOIS

H HONEYWELL

For more facts circle 519 on Reply Card

Why this great new trade-mark brings you more profit from air

Today two fine old companies join hands to bring you new production advantages and economies in this age of compressed air.

Gardner-Denver—famous for progress in air compressor and heavy pneumatic equipment design—now combines its resources with Keller Air Tools to help you make air do more and cost less.

Together, Gardner-Denver and Keller Tool bring you the results of more than 134 years' experience in developing new equipment and in fitting it to your needs—for your greater profit.

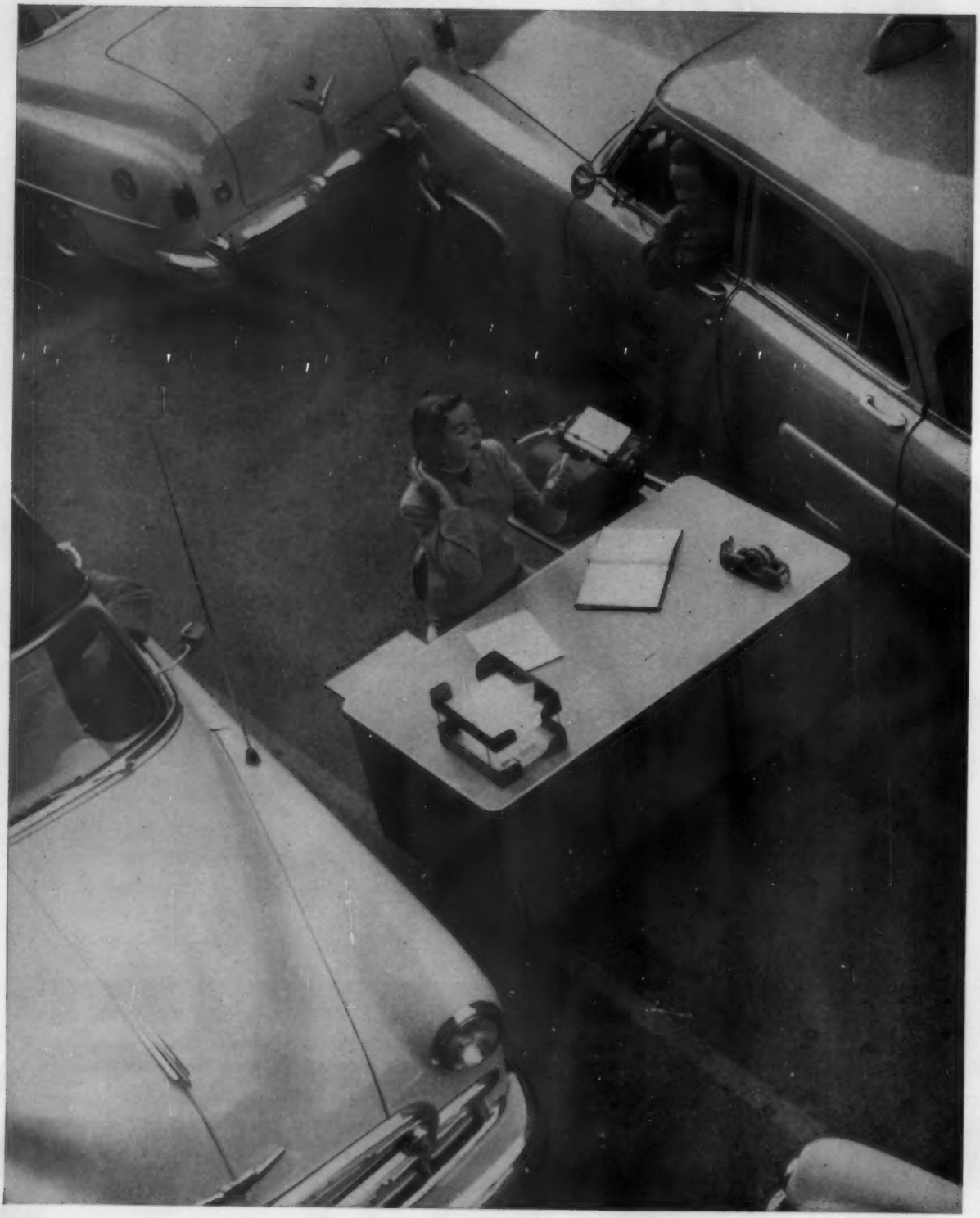
GARDNER-DENVER

GARDNER-DENVER COMPANY, Quincy, Illinois
KELLER TOOL Division, Grand Haven, Michigan

THE QUALITY LEADER IN COMPRESSORS, PUMPS, ROCK DRILLS AND AIR TOOLS FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

For more facts circle 520 on Reply Card

Take your employees out



of the traffic stream!

Big savings can be made in your office by installing metal, movable VMP MOBILWALLS. If you still have a crowded "open office" it gives your customers poor service and your employees a bad time. Errors. Delays. Noise. Confusion. Every day is a losing battle to get work done!

Virginia Metal Products, specialists in metal partitioning, can prove all this with *ratio-delay studies* which accurately rate office efficiency. When you analyse these reports, compare your office with those of firms who have already installed VMP MOBILWALLS and increased efficiency.

For example, the sales office of a radio-tv representative recently solved its traffic stream problem with VMP MOBILWALLS and—

- **Office Productivity increased 30%**
- **Delays and Lost Motion were cut 58%**
- **Time devoted to Distractions and Correction of resulting Errors was cut 55%**
- **The VMP MOBILWALL installation added as much to the work output of the office as could have been added by a 30% increase in employees and payroll!**

...and do it best with metal, movable VMP MOBILWALLS

PUT PRIVACY AND EFFICIENCY into your office or plant with VMP MOBILWALLS. Colors are restful and permanent. Surfaces never chip, warp or crack—wash clean easily. Modern styling for executives and clerks. Anywhere, anytime, you can move MOBILWALLS to suit floor plan changes.

MOBILWALLS ARE EASILY INSTALLED once the traffic flow and basic needs of personnel are studied with the help of the VMP partitioning engineer. Trained, local crews do the entire job in a few hours. Office routine is not interrupted. You save time and money!

Interested? Write to Dept. PE-4 for complete, illustrated literature.

Virginia Metal Products, inc.

ORANGE, VIRGINIA

Subsidiary of Chesapeake Industries, Inc.

For more facts circle 521 on Reply Card

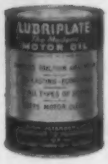
"THIS LUBRICANT ENABLED US TO INCREASE PRODUCTION"

says—PITTSBURGH TUBE COMPANY

"Our 70,000 pound Draw Bench was designed to operate at a maximum of 80 feet per minute, full load. We decided to increase the drawing speed on lighter tubing to 100 and 104 feet per minute. This overloaded the Speed Reducer, however, causing it to overheat. We tried four different makes of oils without success before trying LUBRIPLATE A.P.G. 90. With LUBRIPLATE, we are able to pull heavier tubing than before at 104 feet per minute without the Reducer overheating."

R. S. Vorous
Maintenance Engineer

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.



LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H.D.S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

For more facts circle 522 on Reply Card

BACKTALK about our past issues

Edited by R. L. Marinello

On Making Magazine More Helpful

PLANT ENGINEERING:

"I have been a reader of PLANT ENGINEERING for a long time and have found many useful and practical ideas to use in our plant.

"I believe in keeping files on anything good pertaining to a manufacturing plant, which are many, as you know. I have trouble getting the pages out of the magazine. I have used various means and methods of trying to get these pages out but they never seem straight or some of the subject matter gets cut. Would it be possible for you to perforate each page? It would make tearing them out so much easier.

"Another thing, why not complete an article in consecutive pages so that they could be filed in one size instead of a little piece here and there. Although your publication is better than most, we think it could be improved.

"I know this is asking quite a lot of you people but you would be doing a big favor to your many readers.

"Do you people have any ideas on setting up a good file system for a general manufacturing plant? I would certainly appreciate any help or ideas you could offer me.

"After all this conversation, I would like to ask a favor. I noticed an article

on skid-proof coating for safety in the February issue. We manufacture an aluminum diving board for swimming pools and are having trouble finding a coating that will stay on the aluminum and stand the chemicals in pools and also stay rough enough to prevent slipping. I wonder if this material would be of any use for this kind of application." *H. B. Miller, Superintendent, Giant Manufacturing Co., Council Bluffs, Iowa.*

▶ Thank you for your suggestions to make the magazine more useful for the reader. Your first one—perforating each page—is an interesting suggestion and one which we have never received before. However, publishing and printing, like all businesses, work on a very small profit margin and to perforate each page would mean the expenditure of several thousand dollars per issue.

The problem, too, of continuances is one that is pretty bothersome and one which we realize is annoying to many readers. At times it is difficult to edit the article without having some runover, but it will be something to strive for in 1955.

As to filing systems: we suggest that you write to Special Libraries Association, 31 East 10th St., New York 3, N. Y. The association will put you in touch with a local chapter which will be able to help you.

More information on the skid-proof coating can be obtained from Mr. W. Austin Bishop, Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pennsylvania.—*Editors.*

Flagpole or Antenna?

PLANT ENGINEERING:

"I find that the very article I wanted to read in the November, 1954 issue has been taken out of the magazine. The article is: 'How to Make and Raise a Flagpole or Antenna,' on page 80.

"Will you kindly send me either the article or an issue of the magazine." *D. M. O'Connor, Foreman, General Railway Signal Co., Rochester, New York.*

▶ A copy of the November issue is being forwarded to you with the compliments of the editorial department.—*Editors.*

Water, Water, Water

PLANT ENGINEERING:

"In the January, 1955 issue of PLANT ENGINEERING there is an article on page 77 by Dr. Everett P. Partridge entitled 'Water Always Causes Trouble.'

"It would be greatly appreciated if you could send us a half dozen reprints of this article." *Eric Kunnas, Jr., Lindsay Soft Water, Yardley, Pennsylvania.*

▶ Thank you for your interest in this article. The reprints you requested are being sent to you with the compliments of the editorial department.—*Editors.*

Reader would Like More Info

PLANT ENGINEERING:

"We recently read the article 'Mercury Switch Combinations Assure Safety in Boiler Operations,' on page 52 of the January, 1955 issue and would like to obtain some additional information regarding the equipment used in the system explained in this article.

"Would you please advise us the name of the firm with which Mr. G. F. Suchy is associated so that we may contact him with questions regarding the equipment?

"Incidentally, as a suggestion from one of your regular readers, might I offer for your consideration that it would be extremely helpful to your readers to have the business firm association of the author indicated and the name of the manufacturer of the equipment described in the article also mentioned.

"Other publishers do this, and we have found it extremely helpful and time-

BETZ • *A Great Name In Water Conditioning*

Welcome visitor...

The Betz District Engineer is a welcome visitor wherever he goes. As our personal representative to industrial plants, petroleum installations, institutions . . . plants like yours, he plays an all-important role in our continuing efforts to engineer *controlled* water conditioning.

His job carries many responsibilities. For example, he

. . . instructs your plant operators in Betz-engineered water conditioning control techniques (chemical feed, water testing, chemical adjustment, blowdown control, etc.).

. . . makes regularly scheduled visits to your plant to review operating conditions.

. . . reviews plant control and offers "on-the-spot" constructive criticism and advice.

. . . checks testing procedures, test solutions and chemical feed equipment.

. . . inspects plant equipment and visually observes the results obtained.

. . . discusses any and all water problems with you and your operating personnel.

. . . prepares and submits a complete written report before leaving your plant.

And equally important, he works closely with the Betz headquarters engineering staff to assure the individual attention required for sound, economical water conditioning.

Next time a Betz District Engineer calls, ask him to explain how Betz *completely-integrated* water conditioning service can obtain results in *your* plant. He'll be happy to give you the details.

W. H. & L. D. BETZ, Gillingham & Worth Streets, Philadelphia 24, Pa. In Canada: BETZ Laboratories Limited, Montreal 1.

BETZ

CONSULTANTS ON INDUSTRIAL WATER PROBLEMS

For more facts circle 523 on Reply Card

NEW! 'Sexauer' Monel Self-Locking bibb screw — 10 sizes do the work of 37!

NEW! 'Sexauer' Easy-Tite faucet washer with Fiberglas reinforcing

This nylon plug locks the screw *automatically!*

NEW! Amazing, patented screw and washer combination cuts faucet washer replacements 75%

—with each leak eliminated, you reduce water and fuel bills up to $28.80 quarterly

Most faucet washer failures are caused by wrong length screws. 'Sexauer' Self-Locking screws* and Easy-Tite washers* — used together — cut costly washer replacements 75%! You save up to $28.80 quarterly in water and fuel alone with each leak stopped. Here's how . . .

A screw *too short* for the tapping distorts and splits the washer when tightened; the washer works loose, is torn to shreds. If *too long*, it can't grip the washer; this ruins the washer and causes hammering in the water line.

Simplifies fitting problem—cuts installation costs

'Sexauer' Self-Locking screws eliminate the problem of misfit screws. They lock *automatically* at the required depth as the nylon plug is compressed in the faucet thread. The washer is not distorted, is held firmly.

You can re-use Self-Locking bibb screws repeatedly. Made of Monel, they resist corrosion, never rust; heads won't twist off, screw driver will not distort the slot.

Self-Locking screws save time spent in fitting the proper length—10 sizes do the work of 37! Used with new, Fiberglas-reinforced 'Sexauer' Easy-Tites, they cut washer replacements 75%, fixtures last longer. Easy-Tites resist closing squeeze and excessively hot water, outlast ordinary washers 6 to 1!

Water and fuel savings

One dripping faucet wastes 8,000 gals. of water yearly. A pinhole size stream increases waste to 8,000 gals. in a *single month!* Here is what you save *quarterly* in stopping just *one* pinhole leak on a hot water faucet:

Fuel Saving		Water Saving	Total Saving
Oil (198 gals.)	$22.77	$6.03	$28.80
Coal (2,469 lbs.)	22.22	6.03	28.25
Gas (21,103 cu. ft.)	21.20	6.03	27.23

Save water, fuel and labor costs; conserve costly fixtures by cutting washer replacements 75%! Use *new* 'Sexauer' Self-Locking screws and Easy-Tite faucet washers. *You save every time you do!*

WRITE FOR CATALOG. New 'Sexauer' Self-Locking screws and Easy-Tite washers are just part of the line of over 3,000 'Sexauer' Triple-Wear plumbing repair parts and patented precision tools. Send for our new, 126-page Catalog H. *Write today!*

*Reg. U. S. Pat. Off.

J. A. SEXAUER MANUFACTURING CO., INC. Dept. S45
2503-05 Third Avenue, New York 51, N. Y.

SEXAUER
WORLD'S LEADING SPECIALISTS IN PLUMBING AND HEATING REPAIR PARTS

For more facts circle 524 on Reply Card

BACKTALK

saving to be able to go directly to the author or to the equipment manufacturer for information." *E. G. Murphy, Market Development Manager, Automatic Temperature Control Co., Inc., Philadelphia, Pennsylvania.*

► Mr. Suchy is chief engineer at the Borden Company in Waukesha, Wisconsin, but inquiries should be addressed to his home, 437 Prospect Court, Waukesha, Wisconsin.

The suggestion contained in the third paragraph of your letter is indeed excellent, and we agree that this practice should be followed in all cases. However, in some instances authors have not cleared the use of their company name or the company does not want its name mentioned in connection with the article. In other instances, the use of proprietary terms is approved by a company if we do not use the manufacturer's name—inconsistent as this may seem. We realize that it is always of great value to a reader to be able to know where he can obtain a specific item and even how much it costs, and we try to follow this practice whenever we can.—*Editors.*

Grounding Portable Tools

PLANT ENGINEERING:

"We found the article 'Portable Power Tools — How to Check Them and the Power Source for Safety,' appearing in your February, 1955 issue very interesting.

"We would appreciate your sending us 12 copies of this article as we would like to distribute them to our Safety Committee." *Peter J. Coen, Operating Superintendent, Fresh Meadows, New York Life Insurance Co., Flushing, New York.*

Our Cartoon Editor is Pleased

PLANT ENGINEERING:

"In your February, 1955 issue, there appeared a clever cartoon by Mel Millar, captioned: 'We like your work . . . what there is of it.' on page 116.

"We would appreciate very much your permission to reproduce this in an external house organ we prepare for one of our clients." *A. L. Golay, Advertising Agency Division, Keller-Crescent Co., Evansville, Indiana.*

► You are most welcome to reproduce this cartoon. In fact, we will go one step further and send you the original artwork of this cartoon.—*Editors.*

To Reprint Inert Gas Article

PLANT ENGINEERING:

"I read with a great deal of interest the article on the use of inert gas (CO_2) to prevent clotting, gelling and skinning of paint, in the January, 1955, issue of PLANT ENGINEERING.

"If you would permit me to do so, I would like to reprint this article in a forthcoming issue of our monthly bulletin, *The Broadcaster.*" *J. F. Wagner, Editor, Broadcaster, Independent Oxygen Manufacturers' Association, Cleveland, Ohio.*

► We appreciate your interest in this article and are pleased to give your permission to reprint it in your monthly bulletin.—*Editors.*

Manufacturer of Test Unit

PLANT ENGINEERING:

"Your January, 1955 issue carried an article on page 105 entitled 'Planned Electrical Maintenance.' This article made mention of a new testing device called Multi-Amp. We would appreciate receiving further information on this, especially the name of the manufacturer." *G. A. Gerlitz, Division Engineer, International Milling Co., Minneapolis, Minn.*

► The test unit is manufactured by the Multi-Amp Corp., Harrison, New Jersey, and we have taken the liberty of notifying Mr. George Black at the above company of our interest, in receiving additional information.—*Editors.*

Industrial Piping Article

PLANT ENGINEERING:

"I would like to obtain a reprint or tear sheets of the article 'How to Clean Industrial Piping,' which appeared in the October, 1954 issue of PLANT ENGINEERING on page 92.

"This article contained case histories showing how industrial piping can be cleaned and kept at maximum efficiency." *J. H. Gillman, Chemical Engineers, The Toni Co., St. Paul, Minnesota.*

Chemical Grouting

PLANT ENGINEERING:

"In your February, 1955 issue you have an article 'Seepage Problems—Will Chemical Grouting Help Solve Them?' by John P. Gnaedinger, of Soil Testing Services, Inc.

"Kindly send us the address of this company so we can write for further details." *Ernest Bradd, Wm. Gluckin & Co., Inc., New York, N. Y.*

► The address of Soil Testing Services, Inc., is 3521 North Cicero Ave., Chicago 41, Illinois.—*Editors.*

For more facts circle 525 on Reply Card →

for time-saving, money-saving

POWER DISTRIBUTION

SQUARE D FEED-IN DUCT

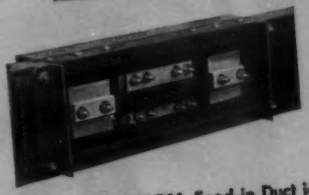
is the most efficient way to transmit large amounts of power. It provides the lowest known voltage drop—only 1.8 volts per 1000 amperes per 100 feet.

Exclusive design requires no ventilation—permits a totally enclosed, compact, dust-excluding enclosure. Rigid construction provides high resistance to heavy electrical stresses.

SQUARE D PLUG-IN DUCT

provides flexible power distribution for branch circuits. Machinery can be rearranged quickly at minimum cost. Plug-in units can be attached at frequent intervals along the length of the duct, providing power where it's needed, when it's needed.

BUSWAY FEATURES PROVE DESIGN LEADERSHIP



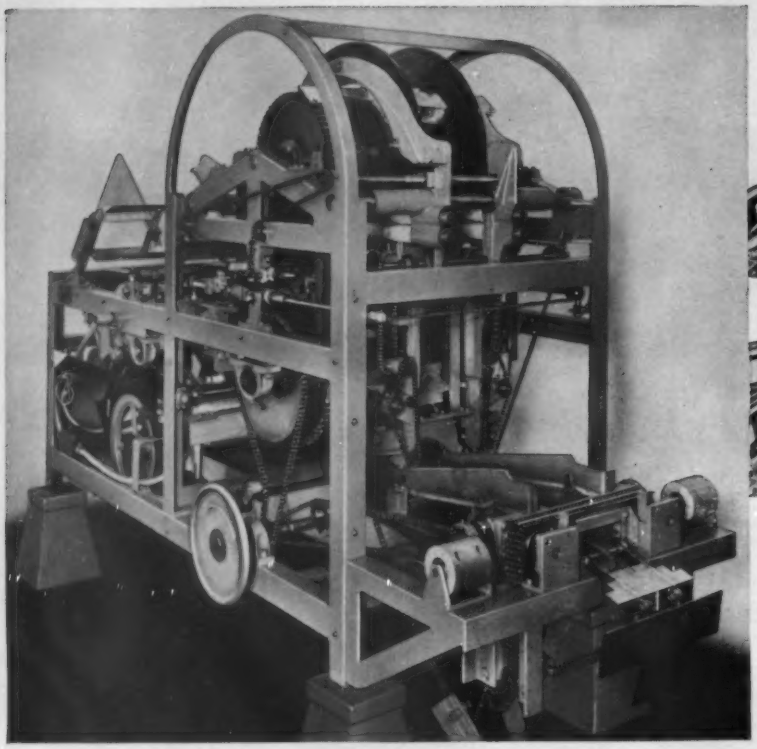
NEW JOINT DESIGN. Feed-in Duct joint design saves installation time and reduces maintenance cost. Duct ends are identical—unnecessary to select mating ends before positioning or hanging duct sections. Outward-facing, pre-installed bolts permit rapid assembly and easy maintenance.

ROUND BUS BARS for Plug-in Duct provide greater mechanical strength and resistance to short-circuit stresses. Circuit breaker or fusible type plug-in units are easily installed at 2-foot intervals along both sides of the duct. Plug-in stabs grip the round bus bars with exceptionally high pressure.

FLEXIBLE CONNECTORS of laminated copper join bus bars between sections—permit proper alignment, insure tight joints and provide for expansion and contraction at Plug-in duct joints. All bolt heads face outward for greater accessibility.

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

SQUARE D COMPANY



TRADE ◇ MARK

DIAMOND ROLLER CHAINS

Diamond Roller Chains widely used on Palmer Carton Set-Up Machine made by Package Machinery Co.

Do you need as much Roller Chain as this? or Something like this?

• Here's really a package of automation — a compact machine essential today in reducing costs and speeding output of cartons.

For such a multiplicity of operations—all precisely synchronized—the uniform quality of every link and foot of the roller chain used is vital to long hours of daily performance.

Diamond Roller Chains provide the dependability and high uniform quality required and give the positive drive of gears regardless of shaft center distances or obstructions.

For simple jobs as shown to the right—the same qualities of Diamond Roller Chains insure the performance you demand—long life, low maintenance, smooth operation.

For the machinery you build and for the many jobs of power transfer in your plant—Diamond in many pitch sizes and widths can serve you.

DIAMOND CHAIN COMPANY, Inc.

Where High Quality is Traditional

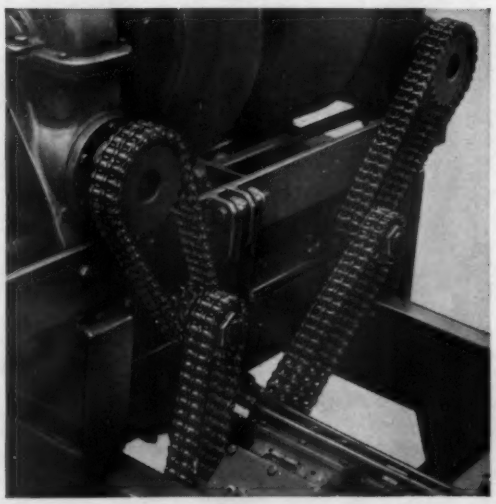
Dept. 614, 402 Kentucky Avenue, Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

ALWAYS PRELOADED

For many, many years, Diamond Chain has been preloaded after assembly for the purpose of bringing pin-bushing seating into stabilized relationship prior to field installation.



Double-Strand Diamond Roller Chain Drives on Tulsa Winch

Stock Roller Chain and Sprocket complete data in Catalog 754—Copy on request.

DIAMOND ROLLER CHAINS

For more facts circle 526 on Reply Card

For more facts circle 527 on Reply Card——→

Unruly urea toes the line

At Deere & Company's towering new $20 million Pryor, Okla., plant, Aloyco valves police the hard-to-handle corrosives involved in producing urea.

Picking Aloyco valves for this tough job came naturally to Foster Wheeler, designer and builder of the 260-ton-per-day unit — newest urea plant completed. These valves are famous for standing up under the worst kind of corrosive and erosive conditions in scores of leading industrial processing plants.

Alloy Steel Products Co., Inc., 1301 West Elizabeth Avenue, Linden, N.J.

5.2

Longer Lasting
ALOYCO
VALVES
SET IN CORROSIVE SERVICE

A penny saved is a penny earned – *maybe!*

Any businessman knows that
saving a few pennies here
can cost a few dollars there.

We've all seen it demonstrated time and again—an inferior product that won't do the job can wind up costing money. As a matter of fact, this old business axiom is being proved in many company washrooms right now.

If the washroom is stocked with low-priced paper towels that go to pieces when wet . . . or if the towels are too stiff to soak up water . . . *then they're not saving a cent.* People will grab a fistful of such towels every time they wash up.

You can expect lower consumption with a quality towel

ScotTissue Towels are not the lowest priced towel on the market, but *one ScotTissue dries two hands.* People don't have to reach for a second towel. This means consumption is lower—and so are your towel bills.

The ScotTissue Towel combines many qualities—such as fast absorbency, wet-strength, stretch, softness and whiteness —which mean much more towel for your towel-buying dollar.

Scott boosts employee morale

People buy more Scott products for their own use than any other brand. So naturally it's the brand they like to see provided where they work. According to a recent survey, good washroom facilities are one of the four main essentials for good employee relations.

Your nearest Scott representative can tell you why ScotTissue Towels will give you lowest towel consumption, greatest employee satisfaction, and lowest towel costs, all things fairly considered. Also, Scott offers a "Planned Poster Program" which you will find helps to cut down consumption, and promote cleanliness in your washrooms. This program can be yours without obligation—write to Scott Washroom Service®, Scott Paper Company, Dept. PE-4, Chester, Pa.

It's good business to use

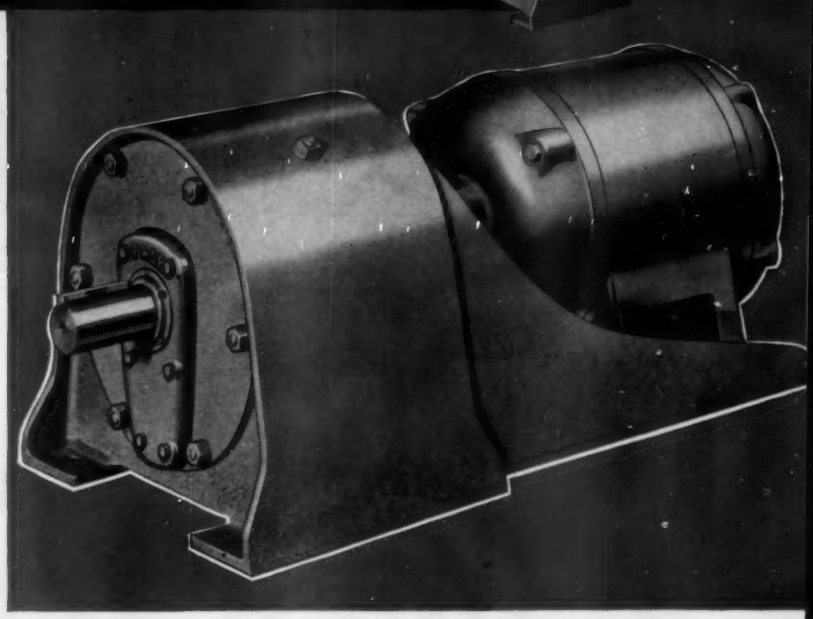
SCOTTISSUE® TOWELS

For more facts circle 528 on Reply Card

With the All-Motor Type,

ALL-STEEL FALK Motoreducer

you can interchange motors in minutes... *on the job!*

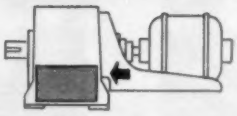


Fast, easy maintenance gives savings in time and money

With the *all-steel,* All-Motor type FALK Motoreducer . . . the only complete and compact motorized reducer with a separately mounted, resilient Steelflex coupling-connected motor . . . you can replace or interchange motors, *or even parts,* in minutes—*on the job,* without long and costly "down time"! Ratios can be changed (within capacity) without motor modification.

Any make, speed, or type of standard foot-mounted motor within the unit's AGMA rating is usable *without modification* on this All-Motor type Motoreducer. Motors with variable speed drive arrangement can be used, if desired. No "partial" motor or special shaft is required in event of motor replacement—simply use a complete motor, available for quick delivery from factory or local stocks without expensive delays.

Add to these exclusive maintenance-saving advantages the FALK "In-built" Factors, described at the right, and you have an unbeatable combination of quality, application adaptability, dependability, long-range economy, and dollar-for-dollar value. Write for Bulletin 3104.



Every FALK Motoreducer has these "In-built" Factors—

Positive Lubrication. Large sump capacity . . . oil-tight construction assures clean lubricant . . . direct dip of revolving elements provides positive lubrication at all speeds.

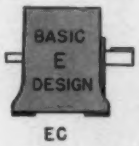
Wide Speed Range. Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

Streamlined inside and outside. Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

Sealed Housings. Dual closures and one-way vents keep oil *in,* dust and moisture *out.* Units are splash-proof, leakproof, dustproof.

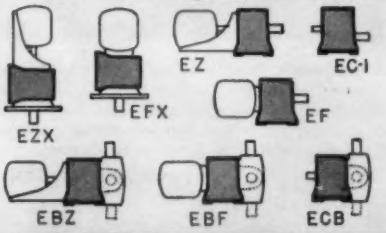
Precision Gearing. Heat treated alloy steel, precision cut and shaved helical gearing throughout . . . quiet-operating crown shaved pinions . . . taper bored gears for easy ratio changes.

All-steel Housings. Unbreakable, strong, rigid. Generous overhung load capacities provided by wide bearing spans, large shafts and bearings.



EC

The basic E design permits maximum use of standardized parts . . . closer control over materials, processing, inspection and assembly . . . resulting in faster delivery from interchangeable stocked assemblies.

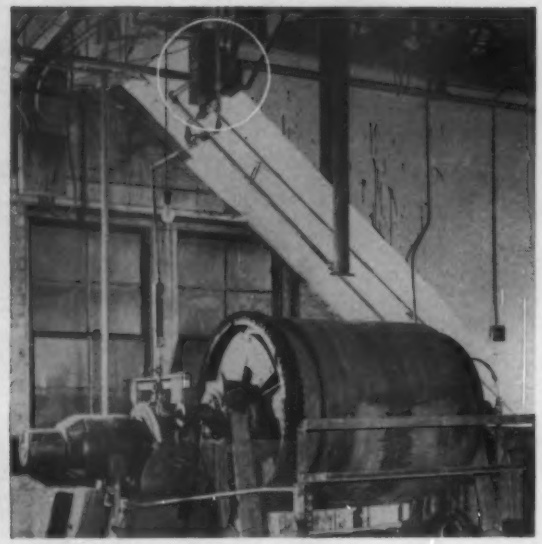


FALK ...a good name in industry

THE FALK CORPORATION · 3001 W. Canal St. · Milwaukee 8, Wis.

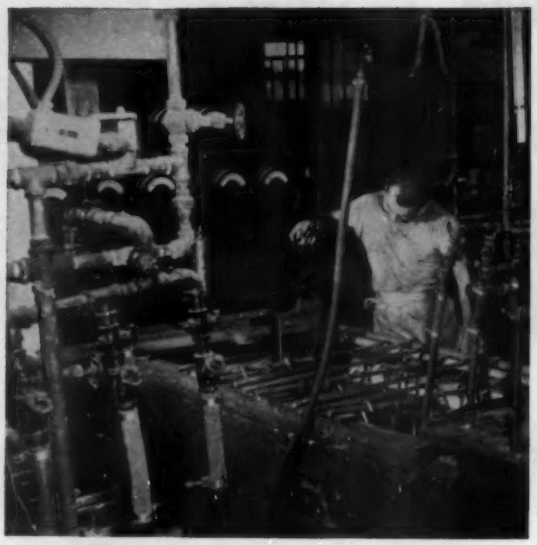
For more facts circle 529 on Reply Card

WRITE FOR BULLETIN 3104



Paint quality is improved *in the grinding phase now that Honeywell Temperature Controls are used at the Western Paint & Varnish Co., Duluth, Minn. These controls help maintain a constant temperature in a steel ball mill for grinding paint.*

Honeywell Controller Cost—$113.40*



Temperature control of plating solutions *is maintained by Honeywell Remote Bulb Controllers at the Kingsboro Electrotype Corp., Brooklyn, N. Y. Now harmful temperature fluctuations are prevented and quality of electrotypes is improved.*

Honeywell Controller Cost—$29.00*

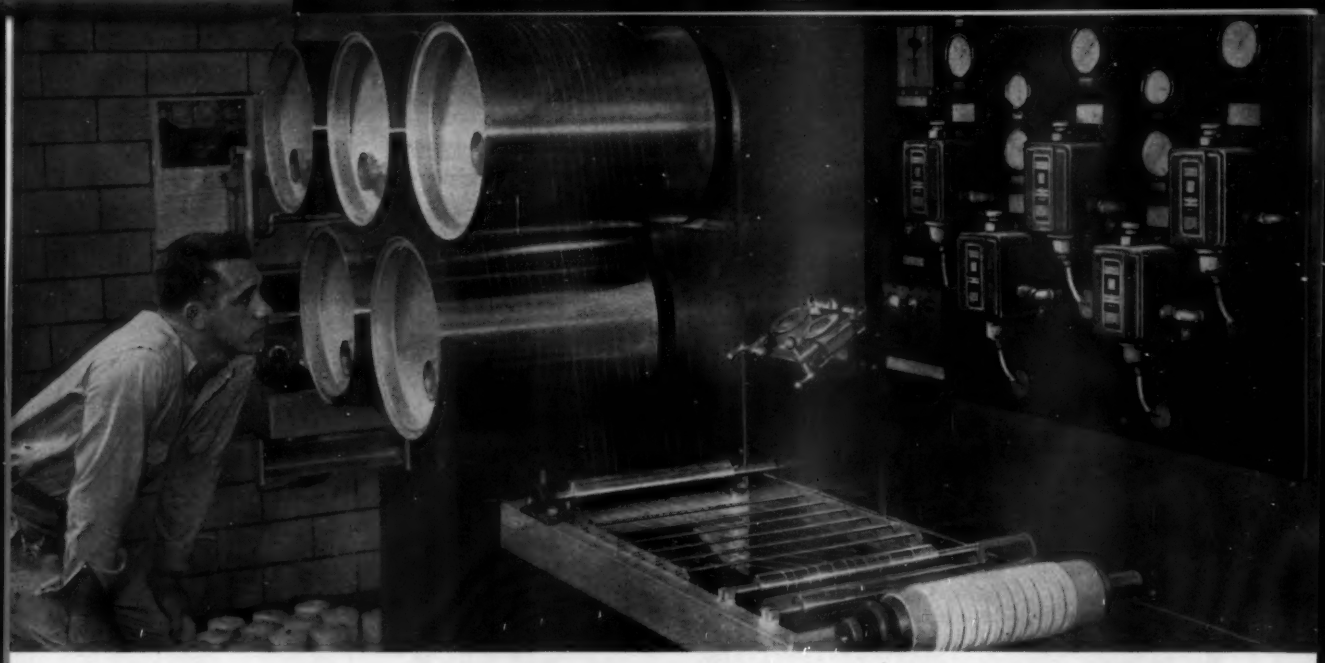
HONEYWELL INDUSTRIAL

Atmospheric "conditioning" *of laminated wall panels at the Upson Company's Lockport, N. Y. plant is regulated by the Honeywell Controls pictured here. Higher quality embossing is attained when moisture content of panels is standardized through a controlled ventilating system.*

Honeywell Controller Cost—$266.40*

Better ware is the result *of controlled drier temperatures at the Jenkins Brick Co., Montgomery, Ala., thanks to installation of Honeywell Temperature Controllers and automatic louver dampers in the drier.*

Honeywell Controller Cost—$131.80*



Scientific drying of freshly sized yarns *in this Monsanto Chemical Company's experimental slasher is regulated by a Honeywell T415 Temperature Controller which insures proper drying speed to give highest quality yarn. Note individual controller for each drying drum on panel at right.*

Honeywell Controller Cost—$28.40* each

CONTROLS *Increase quality*

QUALITY of product can often be markedly increased by the application of a surprisingly simple improvement in plant operation at remarkably low cost.

For example, the unregulated drying speed of freshly-slashed yarns formerly resulted in a sizing-coating being either too soft or too brittle . . . affording little protection for yarn during weaving. An experimental slasher recently proved that, through the use of Honeywell Industrial Controls, drying speed could be so regulated as to insure consistently dried sizing, providing a stronger yarn and a better quality product.

Similarly, throughout the manufacturing world, versatile Honeywell Controls are called upon to increase product quality in hundreds of different ways.

Low-cost Honeywell Controls are uncomplicated in application and in construction . . . designed to perform a job effectively, inexpensively.

Throughout your plant there are many opportunities for Honeywell Controls to improve your product . . . as well as speed production, lower maintenance, reduce costs.

Your nearby Honeywell sales engineer will be glad to discuss how *you* can *increase quality* through the use of these controls. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Also manufacturers of a complete line of precision measuring, recording and controlling instruments.

*List price—subject to change without notice.

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

First in Controls

For more facts circle 530 on Reply Card

PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Edited by M. E. Weissman

Lead Tape Masking

PRESSURE-SENSITIVE lead tape is being used by Pratt & Whitney Aircraft in plating operations on critical areas of nickel, copper, cadmium, chromium, silver and lead parts.

Previously, aluminum or lead foil had been used for masking in plating operations because of their effective thieving action, whereby high current densities at sharp angles are prevented from causing excessive buildup of plated deposit. However, the nonadhering foil did not always give the necessary tight seal since it had to be attached with wire wrapping. This was frequently unsatisfactory. There was also the possibility of etching due to the juxtaposition of two metals, and the resulting galvanic action.

Use of the lead tape has eliminated the disadvantages of the foil. It can be applied to any surface without risk of its slipping out of place. Parts which can now be masked in five minutes formerly required 30 min. Where thieving is required in the plating operation, parts are waxed completely after application of the masking tape. The wax is then scraped from the area to be plated. After plating, the remaining wax is scraped away, and the tape removed. No further cleaning or grinding of the areas adjoining the plated area is required.

Pressure sensitive lead tape makes job of masking metal parts easier, and faster

The tape has also been found useful in plating very small areas. In such cases, use of an organic masking material would reduce the metallic area exposed in the bath so that good plating results would be difficult to achieve. Application of the tape provides an additional metallic area on which metal can be deposited. *From Lead, published by Lead Industries Association, 420 Lexington Ave., New York 17, N. Y.*

Saving with Chemical Plating

WITH THE INSTALLATION of eight 20,000 gal, 80-ft-long dipping tanks, plating aluminum airplane surfaces by chemical conversion in our plant will save more than $300,000 in the first year of use.

Chemical conversion process was chosen in preference to electrolytic process because of the savings to be realized through reduced costs of heat, water, power, compressed air and labor. In addition, processing time is reduced by nearly one-third.

Another advantage is that the chemically-converted coating may be repaired if scratched, while a scratch on the surface of an anodic-process coating would require complete stripping and replating of the part for repair.

It takes a little more than an hour to process a load of about 100 parts.

(Continued on page 40)

Drums Roll on Silicone-Lubricated Bearings, Avoiding "Freezing" and Work Stoppage

MORE THAN 18,000 separate bearings in a roller conveyor system in the Caustic Finishing plant were recently individually lubricated.

The bearings support lines of rollers on which newly-filled drums of solid caustic soda are racked for cooling. Drums are filled with caustic at a temperature of about 700 F. Before much of this heat is dissipated, the drums are moved to the roller racks where they stand for 16 hr. They are then moved out on the rollers for shipment or storage.

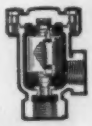
Bearings supporting these rollers were individually greased with silicone lubricant, selected for its resistance to breakdown when exposed to high temperatures

Petroleum based greases, if used on these rollers, would tend to break down under the heat from the drums, with the consequent possibility that a dried out bearing would freeze and interfere with the smooth operation of the conveyor system.

For this reason, the compound used to lubricate the bearings is a silicone grease, made by Dow Corning Co. A metering device insured that each bearing received exactly ½ oz of silicone lubricant from a grease gun. The first application of this type of grease was made upon their installation five years ago. Since that time, none has failed due to lubricant breakdown.

Although the silicone grease costs approximately 20 times as much as a petroleum lubricant, it has proved economical since only one application is required every five years. The probability of production slowdowns due to lubricant failure is virtually eliminated. *From The Dow Texan, published by The Dow Chemical Company, Texas Div., Freeport, Texas.*

Which type of steam trap is best for your need?

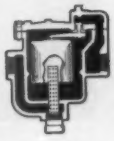


1 Sarco Balanced Pressure Thermostatic

Greatest capacity per dollar cost. Large air venting capacity. Same head and seat, 0-300 psi. Freeze-proof. Cat. 250-A

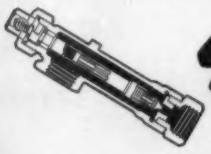
2 Sarco Float-Thermostatic

Discharges condensate continuously at steam temperature and without shock. Responds immediately to varying loads and pressures. Cat. 450-A



3 Sarco Camlift Bucket

New, powerful Camlift valve mechanism permits greater discharge with no increase in size of trap body. Cat. 360-A



4 Sarco Liquid Expansion

Adjustable to discharge condensate below 212°F. Freeze-proof. Not affected by water-hammer or pressure pulsations. Cat. 260-A

5 Sarco Thermodynamic

Valve head, a solid stn. st. disc, is only moving part. Same head and seat to 600 psi. Not affected by superheat, water-hammer, corrosive condensate. Cat. 255-A

With these 5 different types to offer, Sarco can give you impartial advice

Any type of steam trap will do "some kind" of a steam trapping job for you.

But there's a world of difference in trapping efficiency when exactly the *right* type of trap is used for a given application.

That's because both trapping conditions and the characteristics of different types of traps vary widely. There simply isn't any *one* type of trap that will do an efficient job under *all* circumstances. But there is always a particular type of trap best suited for each *specific* set of conditions.

That is why Sarco makes all 5 basically *different* types of traps. In a nutshell, it's to assure you of best trapping results at all times, regardless of requirements.

And don't overlook the very important fact that *only* Sarco makes all these 5 types — not merely variations of one type. Therefore, Sarco can give you absolutely impartial trapping recommendations, backed by 43 years of field experience. Call your local Sarco representative or write:

SARCO COMPANY, INC., Empire State Building, New York, N. Y. Represented in Principal Cities.

2083-B

ONLY SARCO makes all 5 types of traps

—not merely variations of one type!

SARCO SAVES STEAM

For more facts circle 531 on Reply Card

PLANT ENGINEERS' DIGEST

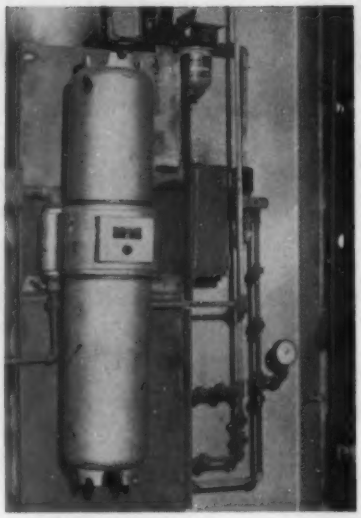
(Digest begins on page 38)

Two overhead cranes carry the parts in stainless steel baskets. The parts are dipped successively in an alkaline cleanser, a water rinse, a deoxidizing bath, a water rinse, the chemical conversion solution, another water rinse, and sealer, before they are put into a dryer tank. *From Boeing Magazine, published by Boeing Airplane Company, Seattle, Washington.*

Infrared Analyzer Hunts CO_2 Reduces Wire Rejects

EXCESSIVE DECARBURIZATION of steel wire during annealing was causing an objectionally high percentage of rejections in an East Coast steel mill. A large proportion of the annealed wire production, which varies from 0.03 to 1.1 per cent carbon content, has to meet rigid specifications.

The company pinpointed the trouble by checking the production process. Quantities of H_2 and CO in the protective atmosphere fed to the inner covers of the radiant-tube type furnaces used, were found to be correct.



Analyzer, in explosion-proof housing checks amount of CO_2 in scrubbed gas

The dew point, reduced to —40 F in an activated alumina tower, was also correct. There remained the trace of CO_2, left in the gas after having been passed through a scrubbing tower, to be measured.

For this, an infrared analyzer in an explosion-proof housing was mounted in the control room of the mill. The analyzer, with a range of 0 to 2 per cent, provided a continuous record of how much CO_2 remained in the gas.

Consistently high readings showed that the scrubbing tower and reboiler were not doing an efficient job, primarily because they lacked the capacity to handle the volume of gas being put through them.

Generator output was cut and reboiler heating capacity was increased until the analyzer indicated that 0.05 per cent CO_2 remained in the scrubbed gas. The result was that decarburization problems almost disappeared and the number of rejects fell to a reasonable level. *From Modern Precision published by Leeds & Northrup Company, Philadelphia, Pa.*

Simple Gage for Oil Tanks

AN INEXPENSIVE oil level sight gage has simplified checking of gravity feed cutting oil tanks on high speed routers and drills, and at the same time has reduced machine downtime in our plant.

Refilling cutting oil tanks on 13 radial arm routers and drills and overhead pin routers used to be a tedious job, since the only means of checking was for the oiler to stop the machine, climb over the oil-slick table, remove the filler cap and look inside the tank with the aid of a flashlight.

To keep the 13 irregularly operating machines properly serviced, the oiler made 10 complete checks each day.

At the suggestion of G. W. Patridge,

(Continued on page 42)

Gas-Filled Motor Adds Safety to Cat-Cracking Operations Twenty-Four Hours a Day

ONE, 3500 HP inert-gas-filled motor, is doing the work formerly handled by eight reciprocating engine-driven compressors at the Standard Oil Company of Ohio plant, in Cleveland.

The motor drives a centrifugal compressor, part of a 270-ft cat-cracker installation which breaks down heavy fuel oil to lighter gasoline products.

Mounted water-cooler keeps gas temperatures down on inert-gas-filled motor

Representing an investment of $75,000 plus $58,000 installation costs, the motor is three phase, 60 cycle and rated at 1800 rpm. It is totally enclosed in a steel case and is filled with inert, non-combustible carbon dioxide. The gas is cooled by an integrally mounted water cooler. Resistance temperature detectors and a low-pressure system help maintain necessary safety standards.

According to R. W. Mills, utilities engineer, construction and operation characteristics of the motor, manufactured by General Electric Company, made it the safest drive that could be used in the cat-cracker. It turns more quietly than conventional power drives and has reduced building vibration. In addition, the motor, which is required to operate around the clock with a minimum of maintenance, has improved output of the cracker. *From Electrical Production, published by the Electrical League of Cleveland, Cleveland, Ohio.*

THESE 3 SUN GREASES WILL DO 95% OF YOUR GREASE LUBRICATION JOBS

—save you the cost and trouble of stocking a large number of "special purpose" greases

FIBROUS • Sun Grease 844X

Has exceptional oxidation stability under high temperature conditions. Recommended for all antifriction bearings. A general-purpose, high melting point lubricant for pressure gun and grease cup application.

BUTTERY • Sun Grease 300A

Especially designed for pressure lubrication of bearings operated at normal speeds and temperatures. Can be used in pressure guns, compression grease cups, or pressure lubrication systems. Has high water resistance and excellent pumpability at low temperatures.

TACKY • Sun Grease 897

For open gears, chains, slides, cams, linkages and bearings. Used whenever "throw-off" must be avoided. High adhesive and cohesive characteristics. An excellent lubricant that is water resistant and does not need frequent application.

Of the 81 different Sun greases, these three can fill the vast majority of your needs. And lubrication simplification like this means worth-while economies for you in several directions. You can reduce the total amount of money you need to "invest" in lubricants. You can greatly lighten the housekeeping job of storing and handling your greases. And you can reduce the confusion and risk of error often created when personnel are required to choose from a large number of greases.

For lubrication points that do require special kinds, Sun offers a total of 78 other greases with a wide range of properties and characteristics.

Find out just how much you can economize by using Sun lubricants. Call in your Sun representative. Or write for information. Dept. PY-4.

INDUSTRIAL PRODUCTS DEPARTMENT

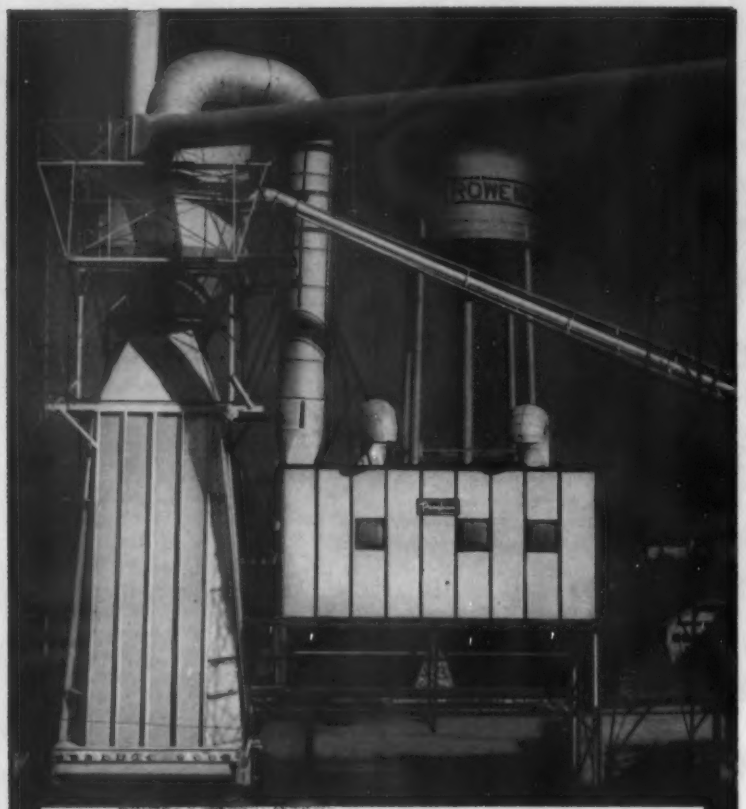
SUN OIL COMPANY

SUNOCO®

PHILADELPHIA 3, PA. • SUN OIL COMPANY LTD., TORONTO & MONTREAL

Refiners of famous High-Test Blue Sunoco Gasoline

For more facts circle 532 on Reply Card



Dust makes it "hot" for Rowe!

Pangborn Dust Control saves Rowe over $12,000 a year in heating costs

Dust used to "make it hot" for Rowe Manufacturing Co., Galesburg, Ill., by posing a serious problem. Rowe, a large producer of wood products (like the Ro-Way garage door), was troubled by the great volume of dust created by its many woodworking operations. Today dust makes it hot for Rowe in a different way! Thanks to Pangborn Dust Control, collected dust now fuels the boilers that provide steam for power and heat. The dust collected by Pangborn Dust Control saves Rowe over $12,000 in heating costs annually! In addition, Pangborn has improved community relations, employee relations and plant cleanliness.

Pangborn can solve *your* dust problem. Pangborn engineers will be glad to show you how Pangborn Dry or Wet Dust Collectors can save you time, trouble and money!

See how Pangborn benefits varied industries. Write for free copy of "Out of the Realm of Dust." Pangborn Corp., 3200 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control and Blast Cleaning Equipment.*

Pangborn CONTROLS DUST

For more facts circle 533 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

Visual gage makes it simple for oiler to check level of cutting oil in tank

plexiglass tube was connected by an elbow joint in an upright position to the bottom of the tank. Oil stands at the same level in the tube and tank. The gages, which cost $1.50 each to install, are at eye level, and all 13 can be seen from the department aisle. *From a release of Temco Aircraft Corporation, Dallas, Texas.*

Washing Machine Cleans Up Messy Salvage Job

SALVAGING SOLDERLESS connectors in our salvage department was messy, monotonous and very time consuming until a cylinder-type washing machine was adapted to the job.

Thousands of these connectors are used on overhead lines to make connections and hold wires together, but since they frequently outlast the usefulness of the lines to which they are attached, the connectors are salvaged when the wires are discarded.

First step in the salvage operation is to clip them from the old wires. Then, the many layers of friction tape wrapped around them for installation, must be removed. This formerly was done by first soaking them in a solvent, then unwrapping by hand. Now, the washing machine is filled with solvent, the connectors dumped in, and the machine revolved. After 40 min, the load is emptied onto a screen, and the solvent is drained off. The connectors are then easily separated from the friction tape, and after careful inspec-

At last!

A TRUE VINYL MASTIC!

Complete protection in a single coat—10 mils thick.

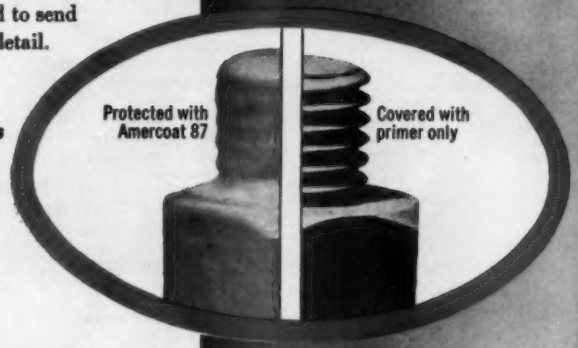
Amercoat No. 87 will cut your maintenance costs because one coat gives you the thickness and protection previously available only through the application of multiple coats.

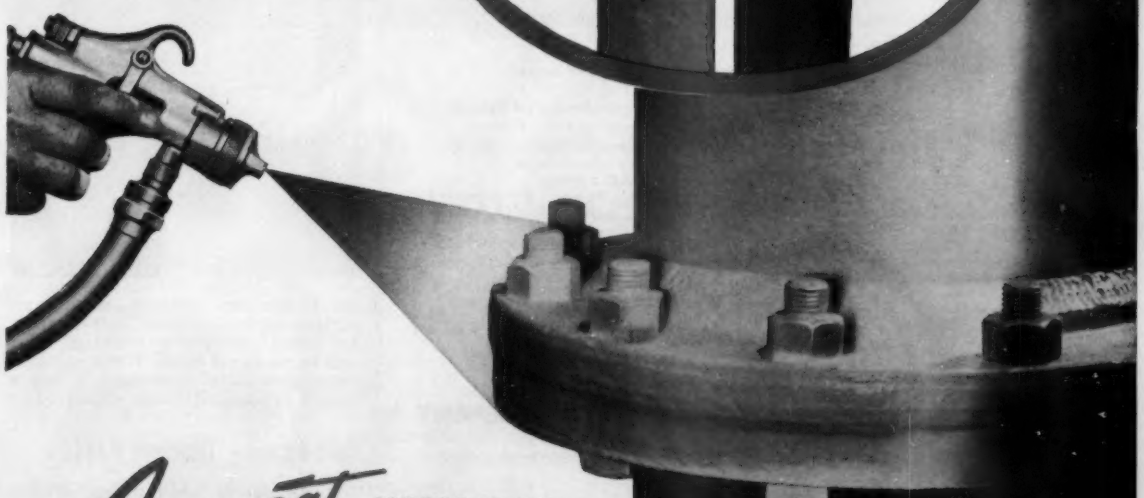
Amercoat No. 87 is the brand new solution to an old problem, for it combines the time-tested chemical and weather resistance of a vinyl with the extra thickness that was heretofore available only in conventional mastics.

Amercoat No. 87 is easily applied with standard industrial spray equipment. Only one cross-spray coat, over a primed surface, is required for complete protection. Because **Amercoat No. 87** is a true vinyl, it is not limited to black, but is available in a variety of colors.

You can save up to 50% of your labor costs with **Amercoat's new vinyl mastic No. 87.** We will be pleased to send you a bulletin describing this new coating in detail.

Notice that the sharp bolt threads, welds and sharp corners are completely protected with one coat of Amercoat No. 87—10 mils thick!





Amercoat CORPORATION

Dept. L
4809 Firestone Blvd.,
South Gate, California

EVANSTON, ILL. • KENILWORTH, N.J. • JACKSONVILLE, FLA. • HOUSTON, TEX.

For more facts circle 534 on Reply Card

The nation's 25 largest* manufacturers cut costs with **Imperial Belts**

In every type of conveying and elevating installation, Imperial Belts out-perform all others.

*Total assets at end of 1953 as reported by the National City Bank of New York.

THESE COMPANIES USE ONE OR MORE OF THESE IMPERIAL BELTS

Aluminum Co. of America
American Tobacco Co.
Anaconda Copper Mining Co.
Bethlehem Steel Corp.
Chrysler Corp.
Cities Service Co.
Dow Chemical Co.
E. I. duPont de Nemours & Co.
Ford Motor Co.
General Electric Co.
General Motors Corp.
Gulf Oil Corp.
International Harvester Co.
Phillips Petroleum Co.
Shell Oil Co.
Sinclair Oil Corp.
Socony-Vacuum Oil Co.
Standard Oil Co. of Calif.
Standard Oil Co. (Ind.)
Standard Oil Co. (N. J.)
Texas Company
Union Carbide & Carbon Co.
U. S. Steel Corp.
Western Electric Co.
Westinghouse Electric Co.

Imperial Standard Rexall for general conveying and elevating
Imperial Standard Rexall Oil Resisting for oily metal parts and scrap
Imperial Rexall 620A for acid and oils, metal parts and feeds
Imperial Black Rexall for heavy-duty grain legs
Imperial Special Black Rexall for elevators and conveyors where moisture is high
Imperial Rexall Package Conveyor for paper cartons and packages
Imperial Sanital for foodstuffs handling
Imperial Hotstock Conveyor for extruded hot rubber stock and tires
Imperial Standard Sahara for conveying and elevating material up to 300° F.
Imperial Insulated Sahara for material to 450° F.
Imperial Super-Insulated Sahara for material to 600° F.
Imperial Ibeco Belting for power transmission
Imperial O&G Belting Licensed API belt
Imperial Rexall Live Roller

Whatever your needs, there is an Imperial stitched-canvas belt job-designed to give you long, maintenance-free service.

Imperial
INNER LOCKED
BELTING
First in stitched canvas belting for over 45 years

You expect more from Imperial and you get more!

IMPERIAL BELTING COMPANY

1759 S. Kilbourn Avenue

Chicago 23, Illinois
Write for new Catalog 54-3. It will help you cut belting costs.

For more facts circle 535 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

Salvaged copper connectors are dumped into washing machine for fast clean-up

tion, are returned to stores for reuse.

In addition to eliminating a messy job, the machine produces a cleaner connector in less time than the old method, and results in an estimated savings of $4000 per year. *From Union Electric News, published by Union Electric Company of Missouri, St. Louis, Mo.*

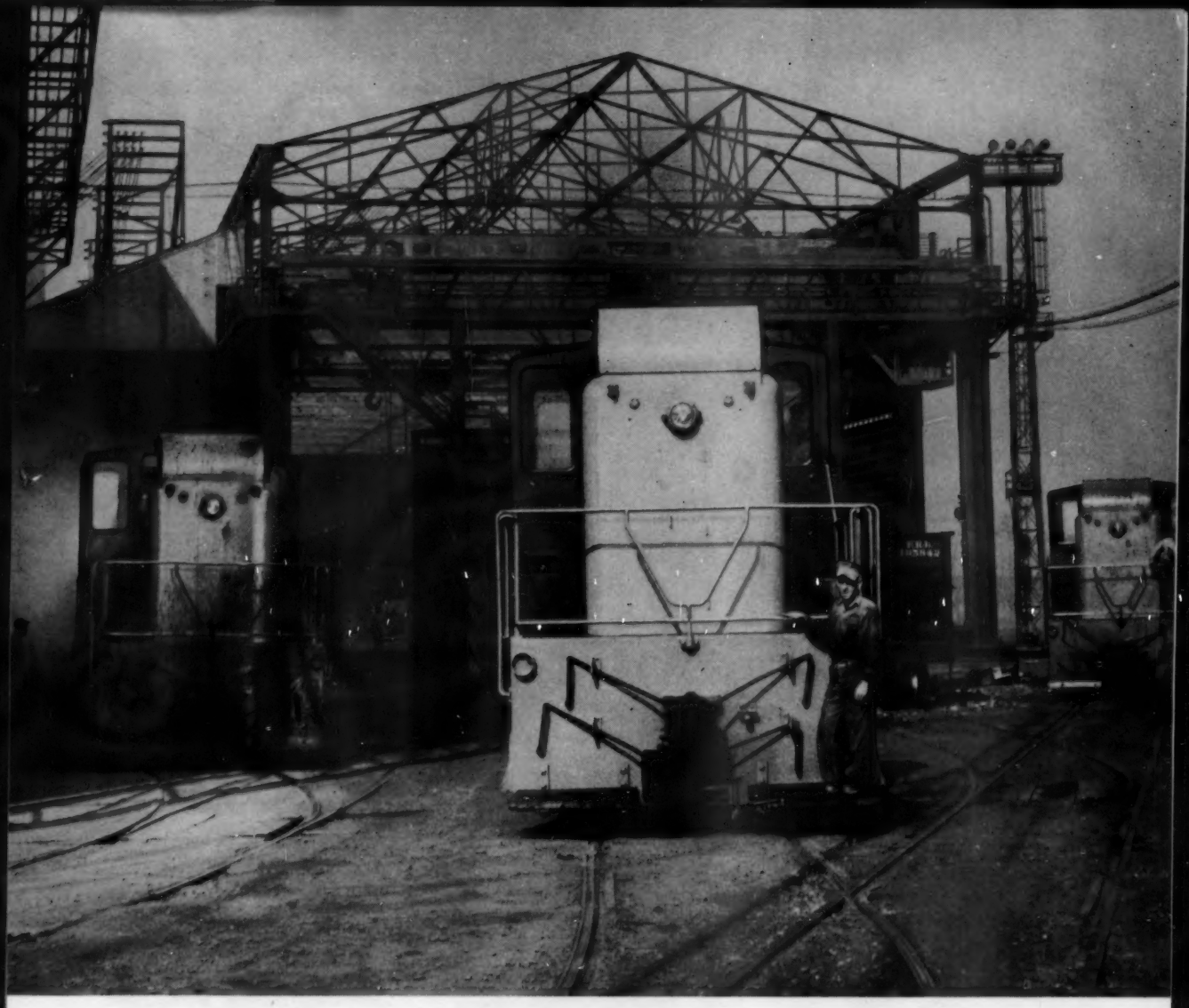
Reusing Corrugated Cartons

Out-of-date and incorrect markings on cartons are being covered with a carton tan paint. With new markings, they will be ready for reuse. Water resistant paint gives added protection. (From a release of Luminal Paints, Chicago, Ill.)

Cold-Forming Titanium Beads

A METHOD of cold-forming titanium sheets to produce curved cylindrical shell beads without cracking has been developed by F. N. LaMartine, tooling research engineer.

The need for such a process became



J&L REPORTS:

"Our Baldwins have run round the clock for 3 years without major overhaul or repair"

"After more than three years of twenty-four-hour, seven-day-a-week service our five 80 ton Baldwins have yet to have a first major overhaul or repair," reports Jones & Laughlin Steel Corporation, Pittsburgh, Pa. "These locomotives have given continual, dependable performance despite the rugged service required in our South Side plant's open hearth work —handling hot ingots, molten slag and general shifting.

"This maintenance record has proved invaluable because availability is so important in work of this kind. Thanks to our Baldwins, we keep operating delay at a minimum, cut production downtime.

"These diesels have several additional advantages. The fuel weight is on the locomotive where it helps to increase tractive effort. Operating costs are low since there is no extra daily expense for hostling, fire cleaning, coal loading or steam charging as with steam locomotives. Furthermore, when entering buildings, the absence of smoke has contributed to our clean air program and has greatly improved working conditions."

Like J&L, you too can get outstanding, efficient service with low-cost maintenance by using Baldwin diesel locomotives. Baldwin-Lima-Hamilton Corporation, Philadelphia 42, Pa.

BALDWIN BLH LIMA-HAMILTON

BALDWIN - LIMA - HAMILTON

Industrial Locomotives

For more facts circle 536 on Reply Card

New Hetron*-Based
Self-Extinguishing "FIRE-SNUF"
Panels by RESOLITE

A blow-torch applied directly to edge of a Resolite Fire-Snuf translucent structural panel slowly ignites the resin and small flames appear.

The blow-torch is turned aside, and five seconds (note stop watch) after source of heat and flame is removed fire on the Fire-Snuf panel is self-extinguished.

When building codes require a flame spread rating under 75 you can now specify Resolite Fire-Snuf translucent panels for plant daylighting.

These panels are molded of fiberglass and HETRON*, a permanently fire-resistant resin, manufactured by Hooker Electrochemical Co.

Fire-Snuf panels, with flame-resistance chemically locked-in, are just as shatterproof and retain all the other features—high strength, stability and load bearing characteristics—which have made Resolite the most popular new material for plant daylighting.

Fire-Snuf is available molded in all standard Resolite corrugations in lengths up to 13 feet and widths up to 42 inches.

For additional information on Fire-Snuf, see Sweet's Files, consult your distributor or write:

RESOLITE
Corporation
Box 517, Zelienople, Pa.
Distributors in principal cities, U.S. and Canada

For more facts circle 537 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 38)

apparent when stiffer and lighter shroud wrappers for the afterburner sections of aircraft jet engines were needed.

A standard type machine was adapted to the work. Both external and internal beads were made on 0.012 stainless steel and 0.012 titanium.

Formability of titanium was less than that of steel due to its lower percentage of elongation.

Two or four adjustable hoops, which hold the metal on both sides of the roller wheels, control the flow of metal into the machine. For internal beads the two inner hoops are used; for external beads both inner and outer clamps are used.

The bead is rolled with the grain of the metal normal to the longitudinal circular axis of the bead. Rolled across the grain, beads of various shapes and depths can be produced without danger of cracking.

This method shows promise of being applicable to beading and corrugating numerous closed uniform sections including elliptical, kidney-shape and irregular. *From Chance Vought News, published by Chance Vought Aircraft, Inc., Dallas, Texas.*

Plastic Bottles Ungum Glue Pot

PLASTIC BOTTLES are helping to maintain a dependable and adequate supply of liquid adhesives for carton and case sealing machines in our Windsor plant.

Shopmade Hydraulic Lift for Presses Is Real Time and Labor Saver

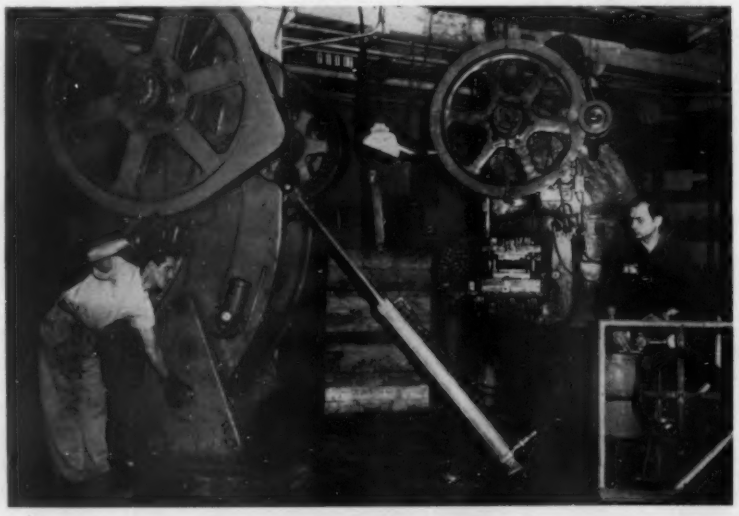
IN ORDER TO BETTER eject parts from dies, the 90-ton, open back presses in our plants must be tilted. This was done with an overhead hoist by three men, and the complete operation took about two hours. However, lowered head room in the new press room made this method of tilting the presses impracticable, so Harry Winter, plant engineer, and Frank Klak, project engineer, designed a portable, hydraulic lift which allows one man to tilt the press, and return that press to production in ten minutes' time.

The lift, made in our shop, uses a 40-in. stroke, 2½-in. bore, hydraulic ram operated by a portable hydraulic pump. A three phase, 3 hp electric motor, producing up to 1200 psi, powers the pump.

Hose connections between the pump and ram are coupler type for fast attachment. Retraction is controlled by a ⅜-in. needle valve.

A permanent bracket to receive the ram is welded to the back of each of the presses, and a second floor-mount is sunk into the concrete floor a few feet from the press. To operate, a cart, mounted on casters and carrying the motor, pump and a 10-gal reservoir, is wheeled into position beside the press. The ram is then attached between the brackets.

Total cost of the lift was $362.19, of which $188.80 was for the hydraulic assembly. Savings in labor and machine downtime during the first two weeks of service, repaid the cost of the lift. *From a release of Viking Air Conditioning, Div. of The National Radiator Company, Cleveland, Ohio.*

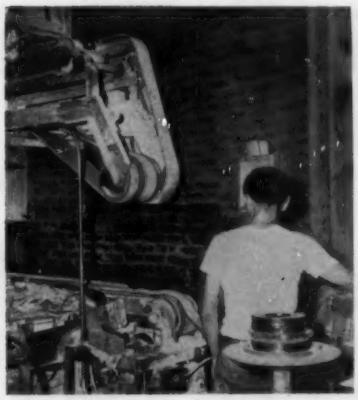


Motor and pump, right, are wheeled into position near press to operate lift

A polyester plastic bottle of about 1 gal capacity, with a screw on cap, is inverted in each glue pan and suspended from a special rigging. An 8-in. drill hole in the cap provides for the flow of adhesive until the level is stabilized. As the glue is used from the pan, air enters the bottle, allowing the glue in the bottle to flow until equilibrium is again attained.

The plastic bottle allows the operator to see immediately when a new supply of glue is necessary. The hazard of broken glass is also eliminated. *From Technical Bulletin, published by General Foods Corporation, White Plains, N. Y.*

Doubling Machine's Service



An 8-in. wide conveyor belt suspended from ceiling enabled us to carry rubber tubing from machine, right, to department 220 ft away. Machine serves another station with lower belt. From release of Thermoid Co., Trenton, N. J.

Water Pistol Comes of Age

A CHILD'S WATER PISTOL which plays a role in converting 20,000 bl of raw crude oil into gasoline and other products each day, recently achieved the status of a full-fledged tool at our Billings Refinery.

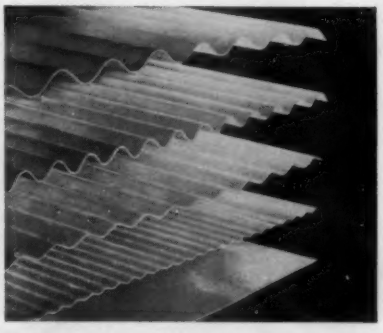
The refinery is interlaced with miles of pipe of all descriptions, including high pressure steam lines with temperatures up to 350 F. Workmen would touch the lines with their hands to determine whether or not steam traps and lines contained live steam. This resulted in many burned fingers. They then resorted to the obviously unsatisfactory practice of spitting on the lines.

The problem was solved by a suggestion from Charlie J. Brabec, second assistant on the "cat" unit. One small squirt from the water pistol on a hot pipe explodes into steam and gives the answer to "Live Steam?" *From the Link, published by The Carter Oil Company, Tulsa, Okla.*

Your plant windows will never have to take this "torture test"

NEW FIRE-RESISTANT PLASTIC makes possible rugged, shatterproof translucent glass fiber panels for plant windows, skylights, partitions, stair wells. Blowtorch flame blackens this window panel, but doesn't make it burn freely. See how burning stops when the flame is removed. Panel contains HETRON®, a new resin that doesn't support fire.

IF YOUR BUILDING CODE calls for a flame spread rating under 75 you can meet the requirement with a HETRON-based panel. You can get panels with ratings of 75, and lower—equivalent to the Building Officials Conference of America classification of "slow burning" or "flame retardant."



YOU CAN SELECT rugged, nonshattering, fire-resistant sheets made with HETRON, in a full range of sizes, gauges, colors; corrugated or flat; translucent or opaque. We'll be glad to tell you which sheet-makers can supply you. Write also for test data and pictures, plus descriptive information on HETRON resins.

HETRON is made by Hooker

From the Salt of the Earth

HOOKER CHEMICALS

HOOKER ELECTROCHEMICAL COMPANY

27 UNION ST., NIAGARA FALLS, N. Y. 4-2449

NIAGARA FALLS TACOMA MONTAGUE, MICH. NEW YORK CHICAGO LOS ANGELES

For more facts circle 538 on Reply Card

Big ventilating-power that comes

Yours with the complete new line of 37 TRANE Utility more work, on more jobs, at low cost . . . and without

Now, for hundreds of *special* plant ventilating jobs, an easy *standard* solution—just pick the fans *you* need from the *complete* new line of TRANE Utility Fans.

You'll find 37 of them in capacities to 15,450 cfm—engineered by TRANE, built by TRANE, each one a compact, ready-to-run unit packing more *ventilating* power at less *horse*power and operating at low noise levels. You'll find they do more work in more places because the line is so complete, each unit so versatile. Now you can choose from:

- *Forwardly curved, belt drive, 12 sizes, 9" to 30".*
- *Backwardly inclined, belt drive, 11 sizes, 10½" to 30".*
- *Forwardly curved, direct drive, 6 sizes, 4½" to 12".*
- *Backwardly inclined, direct drive, 8 sizes, 10½" to 22¼".*

The work-range of these new TRANE Utility Fans answers *hundreds* of ventilation problems; what's yours? Exhausting fumes from forge, furnace, dye vat, laboratory? Ventilating

in small packages

Fans engineered to do making a big noise about it!

oven rooms, storage rooms, locker rooms? Are air volumes and pressures subject to change? Do you want units you can move to another spot with different requirements?

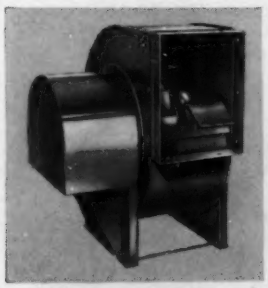
In this versatile line, there's a strong chance you'll find what you need, for "utility" is the middle name of TRANE Utility Fans.

See your nearest TRANE Sales Office or write TRANE, La Crosse, Wis., for Bulletin DS-348U.

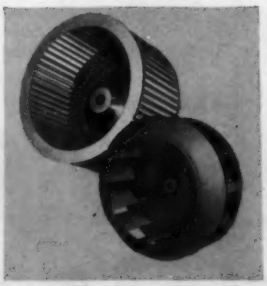
COMPARE TRANE UTILITY FANS WITH ANY OTHERS

- **Deliver FULL rated capacity!** *Tested under the ASHAE and NAFM code, and carry NAFM Certified Rating seal.*
- **Easy-to-use rating tables** *simplify selection of the right fan for the job.*
- **Easy installation!** *Packaged ready-to-run, motor and drive in one assembly, no field alignment.*
- **Precision engineering,** *shaping and positioning of blades insures maximum efficiency.*
- **Airtight lockseam construction.** *Sturdy and trim.*
- **Low first cost, low operating cost.** *Compare!*
- **For extra-special duty:** *For areas with explosive vapors or dust, spark-resistant units available, built to NAFM standards. For corrosive conditions, fans of metals such as aluminum, copper, monel, stainless steel.*

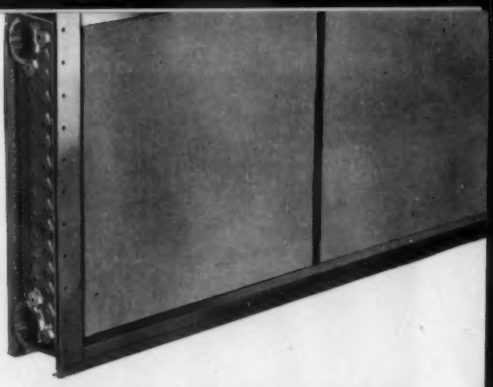
ACCESSIBLE, FLEXIBLE, POWERFUL is this TRANE Utility Fan with inherent flexibility of its belt drive, yet the *portability* you associate with direct-drive fans. Adjustable pitch sheaves make it easy to change fan speeds if you move unit to new location with different cfm requirements. Overhanging sheave simplifies service. Available with hood (being removed) for weather protection outdoors, accident protection indoors.



BACKWARDLY INCLINED fan is often the answer when pressure and air volume are subject to change, due to its self-limiting, non-overloading characteristics.



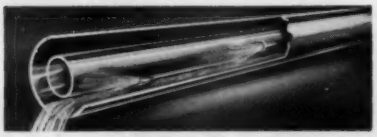
BALANCED FOR SMOOTHNESS! Both forwardly-curved, backwardly-inclined wheels dynamically balanced on the most modern electronic equipment.



In TRANE Coils every square inch does its job

In TRANE Coils, you get stronger coils, easier-cleaning coils, coils in which every square inch of fin surface is doing its job. Exclusive Delta-Flo Fin (cross-section, right) has delta ridge just ahead of each row of tubes. This stiffens fin surface, decreases chance of fin damage, and increases turbulence across fin surface for higher heat transfer efficiency. More efficient fins permit wider fin spacing for easier cleaning, reduced maintenance.

TRANE Kinetic Orifice Coil guards against freeze-up, so it's ideal for tempering outside air. Steam jets out of inside tube (diagram below) in direction of condensate flow, pushes condensate out of tube. Coil is always full of hot steam, temperature distribution across coil is more uniform.



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One source, one responsibility for:
Air Conditioning • Heating • Ventilating
Heat Transfer Equipment

The Trane Company, La Crosse, Wis. • Eastern Mfg. Div., Scranton, Pa. • Trane Co. of Canada, Ltd., Toronto • 90 U. S. and 15 Canadian Offices

TAPER-LOCK

A PATENTED PRODUCT OF DODGE

-OFF THE SHELF

NO REBORING!
NO KEYSEATING!
NO MACHINING!

Ready for the shaft, with no costly, time-consuming operations to make them fit. That's the big news about Dodge Taper-Lock Sprockets. Taper-Lock grips the shaft with the firmness of a shrunk-on fit, yet comes off easily. Bushings may be re-used. They come in sizes to meet most every application.

Taper-Lock Sprockets are available from Distributors' stocks in a complete range of B-type steel sprockets—½" through 2" pitch. Dodge quality Roller Chain is packaged in 10-foot lengths—also available in 50-foot and 100-foot reels. Save time—save money—keep production rolling—get Dodge Taper-Lock Sprockets and Roller Chain from your Dodge Distributor.

DODGE MANUFACTURING CORPORATION, 2700 Union St., Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor, for valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

THERE'S ONLY ONE TAPER-LOCK, THE BUSHING THAT MOUNTS FLUSH!

Standardize, economize with Taper-Lock, the bushing that is interchangeable in Dodge sprockets; sheaves, couplings and conveyor pulleys. *More than 2,000,000 in use!*

DODGE

of Mishawaka, Ind.

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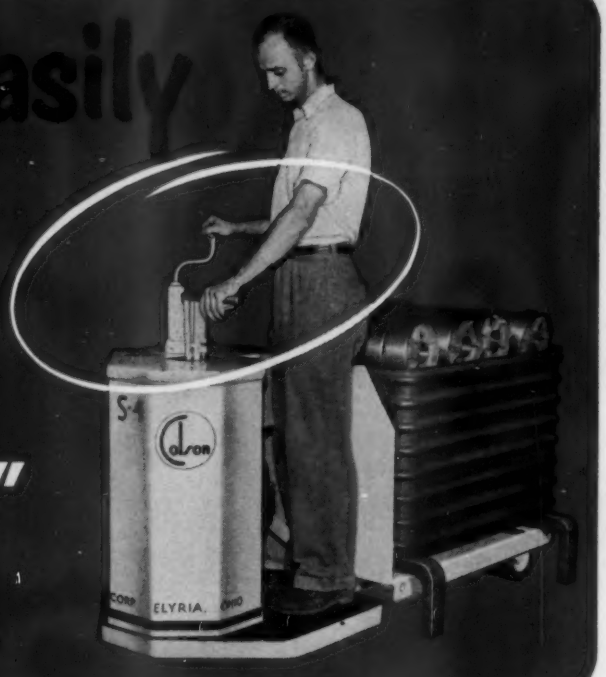
Look How Easily

The Colson® "HANDLER"

Handles Loads up to 4000 pounds



Just one lever does it all...*SHIFTS, LIFTS, BRAKES!*

The "Handler" is the first proved-in-service gasoline powered Lift Truck with hydraulic drive and hydraulic control. Just one lever does all the work — selects; speed range (low or high), direction (forward or reverse), load movement (raise or lower), and brakes (return to neutral applies brakes). Rider has unimpaired visibility at all times — backwards or forwards — and "dead-man" brakes are an important extra safety factor. Six horsepower gasoline engine provides plenty of power for rugged, round-the-clock operation.

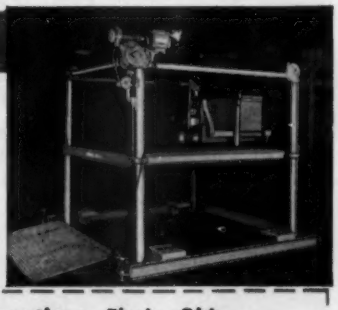
Other Cost-Saving Colson Materials-Handling Products

The Lifter

Makes quick, easy work of transporting and stacking loads Available in single and telescopic models — hand or power operated. Capacities from 150 to 3000 pounds.

The Leveler

Industry's leading device for handling loads between levels. May be portable or permanently installed. Capacity 6000 pounds.



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THE Colson® CORPORATION
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CASTERS AND INDUSTRIAL MATERIALS-HANDLING PRODUCTS

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Please send free literature on:

The Handler ☐
The Leveler ☐
The Lifter ☐
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POLY-CELL

An Entirely New Type of Insulation

**JUST SPRAY . . .
IT FOAMS
AND STICKS!**

- NO CUTTING AND FITTING
- NO MECHANICAL FASTENING

Save time insulating valves, fittings and other irregular surfaces. Save on flat areas, too. Fifteen minutes after spraying, POLY-CELL foams to ⅜ inch, 1 inch or any thickness of insulation you desire. It resists acids, alkalies, solvents, sun and other forces.

POLY-CELL's K factor at 75° F. is 0.24 B.t.u. per hour, per square foot, per inch thickness per degree F. Its temperature limit is 225° F., and the density is 2.25 lbs. per cubic foot.

In the field or on the production line POLY-CELL is quickly applied wherever you can point a spray gun.

Insul-Mastic #4010

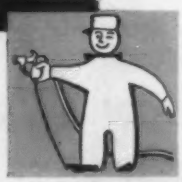
Insulation's most durable vapor barrier

- **STILL THE MOST DURABLE COATING**
- **KEEPS YOUR INSULATION DRY . . . YOUR VESSELS FREE FROM RUST**

What proof of INSUL-MASTIC's quality would you like . . . applications many years old; laboratory vapor barrier and corrosion tests; successful applications in extremely moist or corrosive areas? We can show you all of these. INSUL-MASTIC bituminous coatings have proven their resistance to time, water vapor and most chemicals.

Before you specify, talk to an INSUL-MASTIC technical consultant about vapor barriers, waterproofing, corrosion prevention and insulation. Obtain proper coating recommendations now. There is no obligation for our technical service.

Insul-Mastic



Think first of the coatings that last!

Representatives in Principal Cities

CORPORATION OF AMERICA • OLIVER BUILDING, PITTSBURGH 22, PA.

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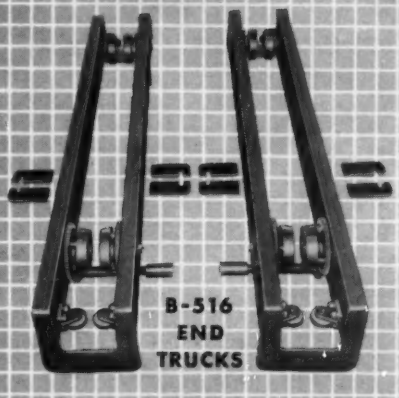
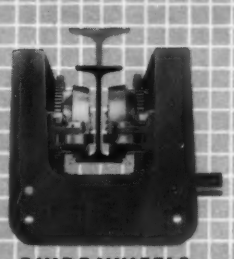
ACCO products

Build Better Cranes with WRIGHT End Trucks, Drive Units and Hoists

And Save Money, too!



B-516 END TRUCKS



GUIDE WHEELS

When you are confronted by a material handling problem, and the decision is to **BUY** overhead equipment, either monorail or cranes may be the solution. **WRIGHT** offers a wide variety of quality hoists, some being hand and others **ELECTRIC**. For production purposes hand hoists are now being replaced by **HOISTS** powered by electricity. For the very latest design see the B-516 **END TRUCKS**. Flangeless wheels permit travel on a variety of beam sizes, **AND** thrust rollers, bearing against the eye beam webs prevent skewing. **CRANE DRIVES** are equipped with a new design of solenoid "drag" brake and are furnished in a wide variety of travel speeds. To save freight charges **BUILD** cranes locally with WRIGHT'S soundly engineered crane components. **MODERN** construction and manufacture call for Timken Tapered Bearings in **MOTOR DRIVEN** trucks and either single speed fluid drive or variable speed **CRANES**.

We will be glad to send you literature carrying full information on any or all of the following WRIGHT Crane components:

Hand Traveling Cranes—top running single bridge Bulletin #DH-468
" " " —underhung Bulletin #DH-348A
Motor Driven Cranes—underhung single bridge Bulletin #227
" " " —top running Bulletins #DH-448 or #DH-449

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Wright Hoist Division
AMERICAN CHAIN & CABLE

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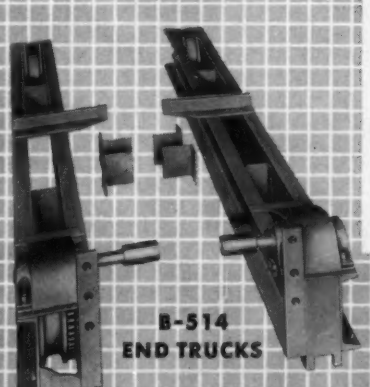
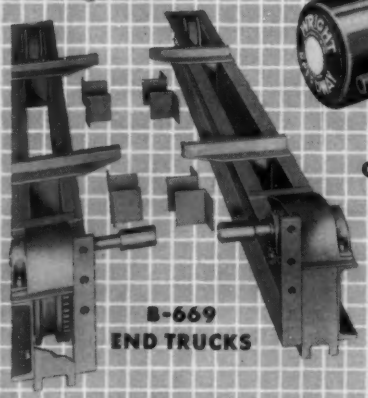
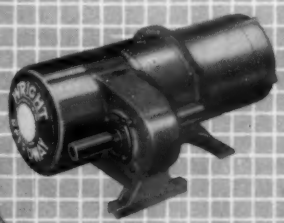


B-514 END TRUCKS

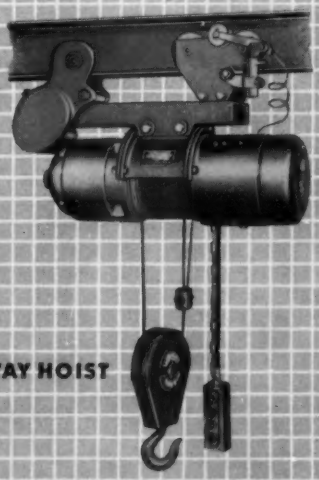
END VIEW



B-669 END TRUCKS



CRANE DRIVE UNIT



SPEEDWAY HOIST

OPERATION AND PRODUCTION pointers for the industrial plant engineer

Edited by H. E. B. Anderson

Tank Car Unloading—but Quick

LABOR AND HAZARDS involved in unloading tank cars have been reduced at the Homestead District Works of U. S. Steel Corporation with the introduction of an unusual hose coupling.

Lubrication oil is delivered to the plant in tank car lots which are unloaded into storage tanks alongside the maintenance stores building. The operation required connecting a flexible hose from the discharge fitting on the underside of the tank car to the inlet fitting in the wall of the building.

Formerly, standard practice in unloading tank cars was followed. The flexible hose was connected to the car by a threaded coupling and required the use of a large wrench. This job usually occupied two men for a half hour. Since the sealing action in the threaded coupling depended upon close contact of the metal parts, the coupling had to be screwed on as tight as possible. A poor seal would allow oil to leak onto the ground, presenting a safety hazard.

Photo: Titeflex, Inc.

Quick coupling on hose permits one-man tank car loading and unloading

By replacing the threaded coupling with a quick sealing Titeflex coupling, the time needed to make the hose-to-tank car connection was reduced from a half hour to a few minutes. Hazards were also reduced, since the new coupling eliminates leakage of oil. This is because fluid pressure in the line will expand the lips of the seal rings, pushing them against the facing ends of the coupling. As the pressure increases the seal becomes much tighter.

The collar arrangement allows full swiveling action of the coupling, avoiding twisting and kinking of the hose.

Ejector Cleans Hole Saw

SLUGS CUT by hole saws are disposed of neatly and quickly when an automatic ejector is attached to the saw pilot shaft.

A steel spring performs the automatic ejection task at Temco Aircraft Corp., Dallas, Texas. It saves the operator 2 to 3 minutes per hole by eliminating the job of cleaning out packed slug material.

At Temco, this material is usually laminated Fiberglas. Slugs formerly were often packed so tightly that operators had to disassemble the saws from the hand drills that power them, in order to clean out the cup-shaped blades.

Plastics fabricator Frank P. Rose, Jr. wrapped a 3½-in. length of steel wire twice around the ½-in. hole saw pilot. He pulled these two loops tight

(Continued on page 56)

Hydraulics Go "Into the Gutter" to Improve Rainfall Removal from Industrial Plant Roofs

Contributed by J. H. Wolfe, Jr., Plant Engineer, Black & Decker Mfg. Co.

WITH THE APPLICATION of fluid mechanics to an everyday problem, the gutters on our plant buildings have been redesigned to perform more efficiently.

Using the Manning formula for flow in open channels,

$$S = \frac{n^2}{2.208} \frac{V^2}{m^{4/3}}$$

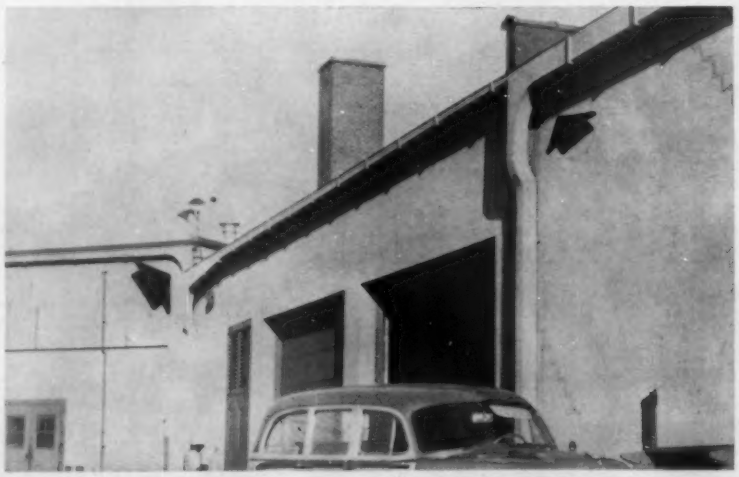
where S = hydraulic slope
n = coefficient of roughness
V = mean velocity
m = hydraulic area

and assuming various widths of gutter, the hydraulic slope necessary to move the water was computed. A rainfall of 3 in. per hour was the basis of the calculations, since local weather bureau records indicated that figure to be the maximum recorded.

On the basis of these findings, one gutter is designed with a slope of 7 in. in 100 ft of length, and another, due to a difference in the amount of roof area served, with a slope of 11 in. in 70 ft of length.

To overcome the usual impedence of the water flow at the entrances to the downspouts, a 2-ft radius was built into the elbows at each downspout entry. The turbulence at the downspout entry has been minimized, since the water no longer has to make an abrupt right angle change in direction. The radius is also helpful in preventing the buildup of twigs and leaves at the downspout entry.

Although the design is calculated on a rainfall so heavy that gutters and downspouts would seem superfluous as it fell, the change in flow characteristics has greatly improved the removal of ordinary amounts of rainfall from our plant roofs.



View of gutters and downspouts on portion of plant. Arrows indicate radius points

SNYDER TANK CORPORATION REPORTS...

J&L Junior JAL-TREAD

Fabricates easily, economically
Provides neat, safe walking surface

Snyder Tank Corporation of Buffalo, New York, recognizes the importance of a safe footing for truck drivers when they climb into the cab or adjust the hitch. That's why, for almost ten years, the top surface of Snyder gasoline truck tanks has been made of non-slip J&L Junior Jal-tread floorplate.

Referring to the use of Junior Jal-tread on late model trucks where fuel tanks replace running boards, E. F. Olson, Sales Manager, says, "It is important to have a safe walking surface here also, because the driver must enter and leave the cab by stepping on the tank. From a customer point of view, the plate (J&L Junior Jal-tread) is neater looking too."

Regarding production costs Francis Snyder, Plant Superintendent, reports that he has less trouble fabricating J&L Junior Jal-tread than other types of steel. He adds that Jal-tread's straight line pattern of raised cleats cuts spoilage and makes fabricating, forming, punching and bending easier.

see our catalog in SWEET'S

Whatever your application in new construction, new equipment or replacement jobs, you'll find that J&L Jal-tread and Junior Jal-tread offer floorings that are long-lasting, safe, neat, easy-to-clean and easy-to-fabricate. Check the advantages of Jal-tread, the only true checkerboard floorplate, today.

Available at leading distributors everywhere

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

J&L STEEL

For more facts circle 544 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 54)

to secure the wire to the pilot, then bent the remainder of the wire into a four-coil cone-shaped spring.

The spring compresses as the hole saw makes its cut, and when the cut is completed, spring pressure is sufficient to pop the slug out of the saw.

Handling Hydraulic Hose

DRAINING ALCOHOL from freshly-cut hydraulic brake hose at the Goodyear Tire & Rubber Co., Akron, presented handling difficulties which were overcome by using aluminum tote boxes supplied by Mutto Mfg. Co., Canton, Ohio.

Perforations in the specially-constructed boxes speed drying and cooling of the hose, which becomes hot and soaked with alcohol during the cutting operation. Alcohol is used as a coolant in cutting, to protect the thin rotary cutting blade. It has been found to be a superior wetting agent to water in this application, and its quicker penetration makes it a satisfactory coolant.

Aluminum tote boxes, perforated for alcohol evaporation, are stacked on truck

The boxes are equipped with a handle at each end. These allow about 75 per cent nesting when empty, but can be pulled over the top of the boxes to permit stacking when full, without damage to the hose.

Goodyear also uses the aluminum boxes for checking production. Since the aluminum absorbs none of the alcohol and is of a constant weight, it is possible to determine the number of pieces of hose produced, by weighing the loaded containers and employing a unit weight for each hose length.

Previously, Goodyear drained the hose in cardboard containers which deteriorated rapidly when saturated with alcohol, and could not be used to determine production levels by weight.

Dry Chemical Fire Protection Approved by Underwriters Lab

BASED ON CONCLUSIONS of more than 1600 tests conducted over a period of five years, Underwriters Laboratories, Inc. has granted its first approval to a dry chemical piped system of fire extinguishment. Developed by Ansul Chemical Co., Marinette, Wis., the system provides automatic fire protection against Class B and Class C fire hazards with a dry chemical, which is conveyed through pipes and expelled in the area surrounding the fire.

The approval applies to the installation of dry chemical piped systems to protect hazards such as paint dip tanks and spray booths, ovens, driers,

(Continued on page 58)

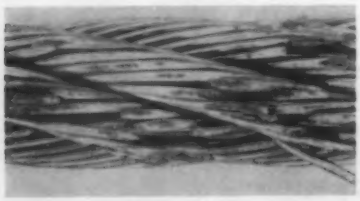
Neoprene Jacket Protects Mooring Cable from Corrosion Fatigue in Underwater Application

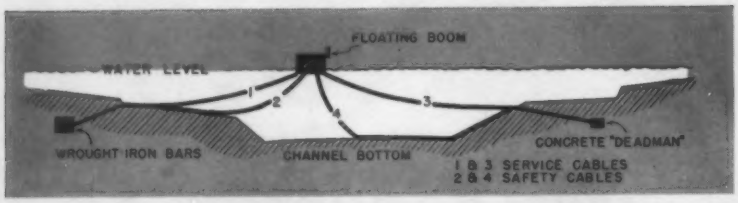
ON THE UPSTREAM END of the lock on Kentucky Dam, in the Tennessee River, a floating guard boom juts into Kentucky Lake. Purpose of the boom is to guide barge tows into the lock to prevent traffic from colliding head-on with the end of the lock wall.

The 470-ft boom consists of four hollow concrete boxes attached end-to-end, and its outer end is moored by heavy steel cables to concrete "deadmen" buried in the lake bottom.

The four cables attached to the end of the boom vary in length from 171 ft to 330 ft. Two are service cables and are suspended in water. The remaining two cables are for emergency use, and are buried in silt for about two thirds of their length.

The original cables, placed in service in 1945, were of galvanized wire rope, 2¾-in. in diameter. During manufacture, internal voids in the cable were filled with heavy lubricant and the finished cable was given a similar coating.





Broken wires in original cable (upper left) used to moor floating boom (upper right) resulted from corrosion from lake waters. Sketch shows cable arrangement

Less than five years after installation, the two emergency cables were pulled to the surface for inspection and found to be in poor condition. Seventy-four broken wires were counted in one of the cables, while breaks in the other were too numerous to count. Breaks were confined to the portion of the cable that had been buried in silt and a few areas where the lubricant had been worn away, possibly by abrasion.

Failure was diagnosed as corrosion fatigue made possible by the removal of the surface lubricant, and perhaps accelerated by stray electric currents.

After this inspection, all four cables were replaced by neoprene-jacketed cables. They are 2¾-in. in diameter with minimum breaking strength of 555,000 lb. Wires are zinc coated and internal voids are filled with sealing compound. The Du Pont neoprene, similar to the standard material used for underground electric cable, is vulcanized. It fills the uneven exterior surface of the cable and affords a smooth sheath with a minimum thickness of 3/16 in.

The cables have been in service for about three years. Experience with neoprene-jacketed cables in the electrical industry promises greatly increased longevity over the unjacketed cable originally installed.

The Ultimate in Needle Valves

Here is one of the crowning achievements of Marsh research, design, and manufacturing skill. It is the first needle throttling and shutoff valve to combine *all* of the qualities called for today in this highly critical and ever broadening field.

It is a valve that has strength and safety to spare . . . rated for pressures up to 10,000 psi—equally efficient in the lower ranges. A product of Marsh instrument-making and valve manufacturing experience, it combines instrument-like precision with the ruggedness that distinguishes all Marsh valve specialties.

The illustrations tell the story of new thinking; new standards. Body and stem-guide are machined from extra-heavy carbon steel bar stock. Still greater strength and rigidity are achieved by fusing the stem-guide into the body. The complete fusion of guide and body is accomplished by the exclusive Marsh "Conoweld" process.

There are two big advantages to this one-piece construction: (1) It eliminates the danger of unscrewing the valve from the body when opening—a frequent cause of leakage, even dangerous blow-outs (2) It permits perfect line-up of threads and seat. As a result, Marsh valves are easier to operate even at high pressures.

The precision-machined stem is 416 stainless steel. Stem threads are fine pitch for extra strength and fine, controlled regulation. Notable advancements are special "Marpak" one-piece, non-binding longer-lasting packing; deep thread chambers, keeping inlet and outlet piping away from ports and contributing excellent flow characteristics. Entire packing nut and packing gland are electro-zinc plated, preventing corrosion and giving the valve a handsome, plated exterior. The rugged malleable handle is finished in heavy baked enamel.

The new needle valve line includes globe and angle patterns with double female connections in sizes ⅛", ¼", ⅜", ½", ¾" and 1". Also globe and angle valves with male inlet and female outlet in sizes ¼" and ½". *Complete stock carried at our Skokie, Illinois factory and also at our branch plant in Houston, Texas.*

Write today for catalog giving complete details.

MARSH INSTRUMENT CO. *Sales affiliate of Jas. P. Marsh Corporation*

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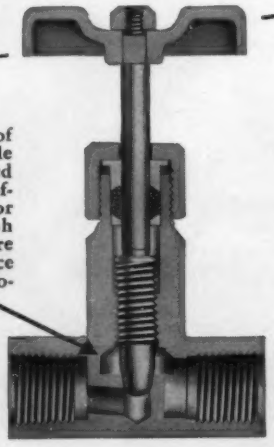
MAXIMUM WORKING PRESSURE
10,000 PSI
for water, oil or gas

- Body and stem guide extra heavy bar stock fused into one piece.
- Valve stem 416 stainless steel.
- Packing special one-piece "Marpak" moulded ring.
- Bodies marked in accordance with MSS regulations.

ONE PIECE

The stem guides of conventional needle valves are screwed into bodies—this often causes leakage or blow-outs. Marsh Needle Valves are fused into one-piece by exclusive "Conoweld" process.

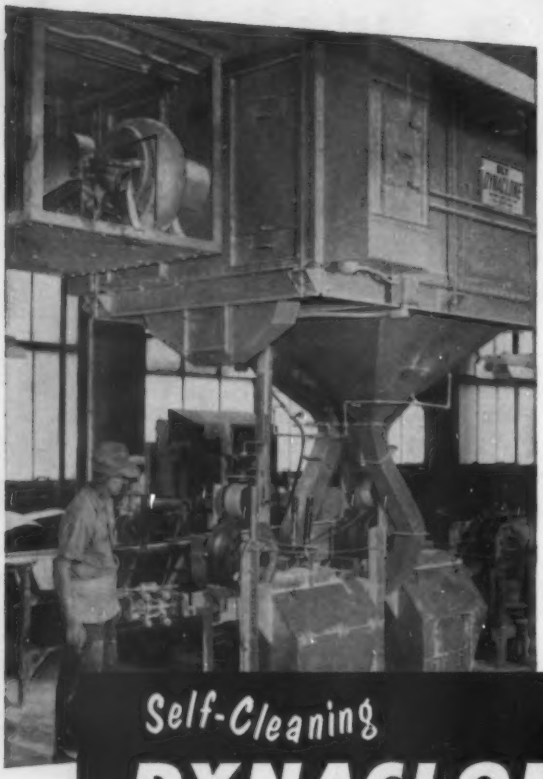


MARSH

"THE STANDARD OF ACCURACY"

For more facts circle 545 on Reply Card

SLY PIONEERS & LEADERS in INDUSTRIAL DUST CONTROL



1 OF 4 UNITS AT GOODRICH

Self-Cleaning
DYNACLONE
The Ultimate Dust Collector

No matter how dusty your manufacturing operation, you can effectively control the dust. Take the case of The B. F. Goodrich Company.

This company processes garden hose by passing it through pigment dusting chambers. There are two dusting chambers—shown on the floor below the filter—one for soapstone (talc) and the other for zinc stearate.

Dust-laden air from this operation is drawn through vertical ducts to the Sly Dynaclone two-compartment Filter, above. The dusting compounds are kept separate and are returned to the chambers for re-use and the cleaned air returned to the plant. *No material is wasted—all is used, meaning substantial savings. No cleaning-up operation—always a clean plant!*

Self-cleaning by reverse air, the Sly Dynaclone represents the greatest advance ever made in industrial dust collection. Without added motors or blowers, it maintains a constant, uniform suction at dust sources. No shutdowns, no shaking, no wearing of bags. In use since February, 1951, it has operated continuously—*24 hours a day*. Well pleased, The B. F. Goodrich Company has purchased large Dynaclones for three other plants.

THE W. W. SLY MANUFACTURING CO.
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New York • Chicago • Philadelphia • Syracuse • Detroit • Buffalo
Cincinnati • St. Louis • Minneapolis • Birmingham • Los Angeles • Toronto

For more facts circle 546 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 54)

oil quench tanks, flammable liquid pumping stations, transformer vaults, diesel and gasoline engines, generators, oil storage tanks, flammable liquid storage rooms, asphalt saturators and marine hazards.

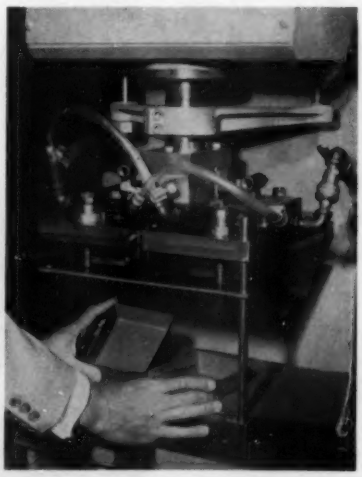
Already installed in the metal fabricating, aviation, petroleum, chemical, paper and automotive industries, as well as the electrical utility field, dry chemical systems provide either manually or automatically controlled protection, and can be operated from locations remote from the hazard area. Pneumatic rate-of-rise heat detection devices or electrically operated releases can be used to trigger the chemical systems. Within a few seconds after detection of a fire, dry chemical is discharged in the fire area, either in local application or total flooding.

Doors, windows, ventilation ducts and operating valves can be closed automatically by the system's nitrogen pressure. An electric switch can be energized by the system, to turn off fans or machinery and sound alarms. With the use of automatic selector valves, one piped system can protect two or more areas; dry chemical is directed selectively into the area where the hazard exists.

Stampings from Plastic Sheet

RAPID FORMING of rigid vinyl plastic products, using conventional metal stamping equipment, has been demonstrated by B. F. Goodrich Chemical Co., Akron, Ohio.

Formerly, expensive injection mold-



Rigid plastic boxes stamped from plastic sheet in standard stamping press

A completely new and different

PAYLOADER®

TRACTOR SHOVEL

Powerful break-out digging action

Fast, efficient bucket-loading action of the new Model HA "PAYLOADER" begins when the machine moves forward and forces the 18 cu. ft. bucket into the pile with up to 3,100 pounds of push.

Twin, double-acting hydraulic rams, independent of the boom elevators, next rotate the bucket on its hinges . . . the cutting edge slices up through the pile in a powerful "break-out" digging action.

Bucket roll-back of 40° is now completed. The loaded bucket is close to the machine and low — only six inches off the ground—in a stable, sure position for safe, rapid transport at speeds up to 10 mph.

Your Hough Distributor is ready to demonstrate this completely new and different Model HA and what it can do.

THE FRANK G. HOUGH CO.
770 Sunnyside Ave., Libertyville, Ill.

Send complete information on the 1955 Model HA "PAYLOADER"

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TITLE _____

COMPANY _____

STREET _____

CITY _____ STATE _____

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HIGHER PRODUCTION and LOWER COSTS with Jade-Lites

IMPROVED LIGHTING EFFICIENCY with Lustra Jade-Lite Fluorescent Tubes because of—

LESS GLARE, which in turn—

ELIMINATES EYESTRAIN in close, critical work areas, with the result that—

PRODUCTION IS STEPPED UP SUBSTANTIALLY!

Your local Lustra Man, a Lighting Specialist, is equipped to prove these statements—to help your organization up production and increase profits. For information, write **Lustra Corp., Dept. PE-4, 36 Washington St., Brooklyn 1, N. Y.**

Lustra
AMERICA'S DATED LAMPS

For more facts circle 548 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 54)

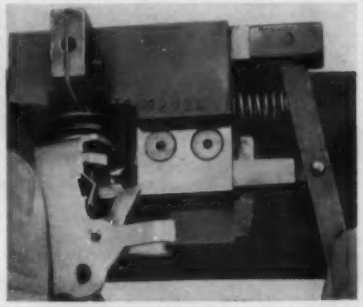
ing machines and slow hand-operated draw-forming or blow-forming presses were needed to process rigid vinyl plastic. With the new method, a fast conveyor belt process takes the plastic sheet from a preheat oven through to the conventional metal stamping press which forms the finished shape.

In the demonstration, small boxes were fabricated from Geon rigid vinyl plastic. Raw material was 1/20-in. thick sheeting, embossed on one side with a simulated weave pattern. The sheeting was fed from reels under a bank of Chromalox strip heaters which raised its temperature to 260-275 F.

Two sets of driven rubber rollers control the movement of the sheet, and a clutch arrangement permits the sheet to be fed intermittently to the conventional metal stamping press. Cycle time is 10 seconds, and the stock is cut off during the molding operation.

Fixture Fits Spring Pins

IN THE CONSTRUCTION of plastic adjustable trip buttons, a feature of I-T-E Circuit Breakers, a light-duty spring pin serves dual purposes. It

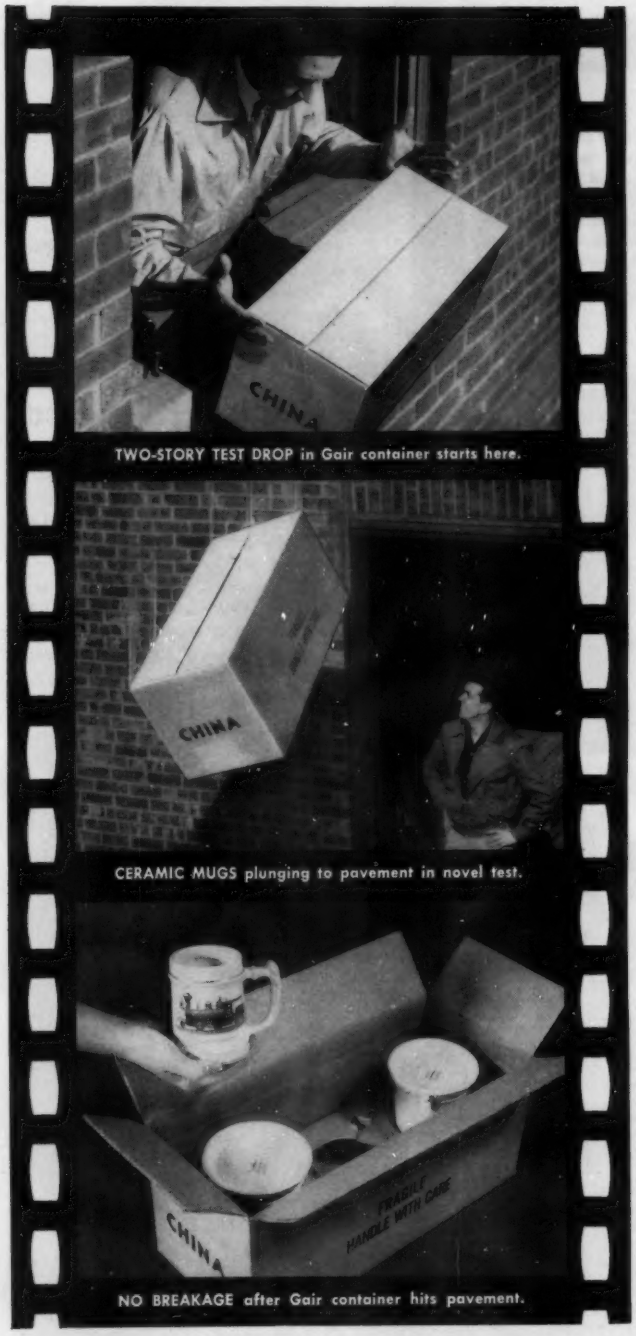


Movement of hinged lever arm to left forces spring pin (arrow) into place

holds the button in place in the trip assembly, and it positions the device in any one of five trip settings when the button is turned.

It is necessary to get a close fit of the pin in the hole, since only friction holds the pin in place; thus for solid pins, the holes would have had to be reamed.

To eliminate the reaming operation, I-T-E engineers used Sel-Lock spring pins, made by Standard Pressed Steel Co. The pins are actually split tubes with axial slots wide enough to allow several thousandths of an inch contraction when the pins are force-fitted into drilled holes. This contraction makes it unnecessary to ream the holes



TWO-STORY TEST DROP in Gair container starts here.

CERAMIC MUGS plunging to pavement in novel test.

NO BREAKAGE after Gair container hits pavement.

Ceramic mugs tumble two stories – no damage!

New shipping container holds breakage claims to phenomenal 0.035%

That's the happy ending to L. G. Balfour Company's long search for the safest practical way to ship ceramic mugs.

General Manager Ed Holder faced a twofold packaging problem. First, ceramic mugs need a lot of protecting in transit. Second, the package had to take three different styles and sizes of mugs.

Gair came up with the answer to both problems with one ingeniously die-cut interior packing piece which cushions the mugs from all shocks. Out of 150,000 units shipped in the new container, only 53 breakage claims have been made. Also, since no partitions have to be set up and no excelsior or paper-stuffing is used, *one* packer now does the work of *four* previously required.

Whether it's protection, display or delivery you're looking for in a shipping container, Gair has the experience and facilities to give it to you. Write us. SC.5.1

YOU'RE LIVING NEXT DOOR TO THE EXPERTS

GAIR CONTAINER PLANTS: Atlanta, Ga. • Cambridge, Mass. • Cleveland, Ohio • Holyoke, Mass. • Los Angeles, Cal. • Martinsville, Va. • No. Tonawanda, N. Y. • Philadelphia, Pa. • Plymouth, Mich. • Portland, Conn. • Richmond, Va. • Syracuse, N.Y. • Teterboro, N. J.

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Model 16-3 Contour-Matic DoALL Band Machine mounted on UNISORB pads to reduce transmitted vibration. No bolts or screws are used. Machine is supplied with 4 UNISORB pads and cement which dries overnight.

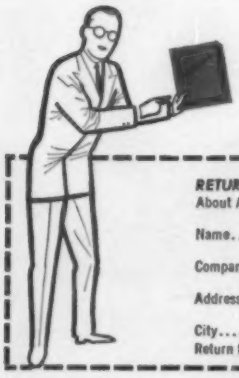
UNISORB® MOUNTING PADS are supplied with the new DoALL Contour-Matic Band Machines...

New Contour-Matics are installed on UNISORB pads, without floor drilling, without bolting the machines in place.

Practically every type of production machine can be quickly installed on UNISORB pads. Labor savings are as much as 20%. Transmitted vibration is reduced 60% to 85% and you get quieter operation.

For full information about this modern way to install your machines, return the coupon for your free copy of the booklet about UNISORB.

LOOK FOR THE RED CENTER AND UNISORB BRAND MARK



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OPERATION — PRODUCTION

(O and P begins on page 54)

for close tolerance, and saving this reaming operation reduces the cost of producing the trip assemblies.

An assembly fixture was designed and built in the I-T-E plant, to insert the spring pins into the holes. Using a lever action, the fixture facilitates force-fitting pins into holes at the rate of 120 per hour.

Dust Control for Pharmaceuticals

AIR CONDITIONED work rooms, low humidity, and a finely powdered product contributed to a dust problem in the plant of Charles H. Phillips Co., Glenbrook, Conn., manufacturer of pharmaceuticals.

A dust control system in use was inadequate for prevailing conditions since it removed only 10 - 15 per cent of the dust created. A study showed that local exhaust ventilation incorporating hoods at each machine, duct-

Photo: American Wheelabrator

Dust from mixer is exhausted through duct from hopper and discharge spout

work and a collector appeared to be the most satisfactory choice for a new dust collecting system.

New hooding and ductwork was designed to pass air at high velocity. Since the dust to be collected was of very fine particle size, cloth filters were used in this operation.

Two Wheelabrator Dustube collectors were installed and operated in combination. Cotton sateen cloth was selected as most suitable filtering medium for this operation after a study was made of air temperature, and the corrosive, chemical and abrasive qualities of the dust.

A mechanical shaker is used to

"Under Way On Nuclear Power"

As she blinked this terse message, the *USS Nautilus* cast off and steamed to sea leaving an old era of oceanic travel in its wake.

This is the first nuclear-powered, steam-turbine-driven submarine ever to be built. With the eyes of the world watching, it was a project with no margin for failure. Exhaustive sea trials which tested every feature of her equipment proved that the only acceptable result—success—had been completely realized.

We take pride in Walworth's share in this momentous achievement. For, from the days when the *Nautilus* was still on the drawing board to the last stage of construction, Walworth engineers worked directly with the Electric Boat Division of the General Dynamics Corporation—helping with the myriad of piping problems this new concept of transportation posed. Now the *Nautilus* prepares to join the fleet with Walworth Valves and Fittings, both standard and special items, installed.

We are glad to be aboard.

WALWORTH

Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

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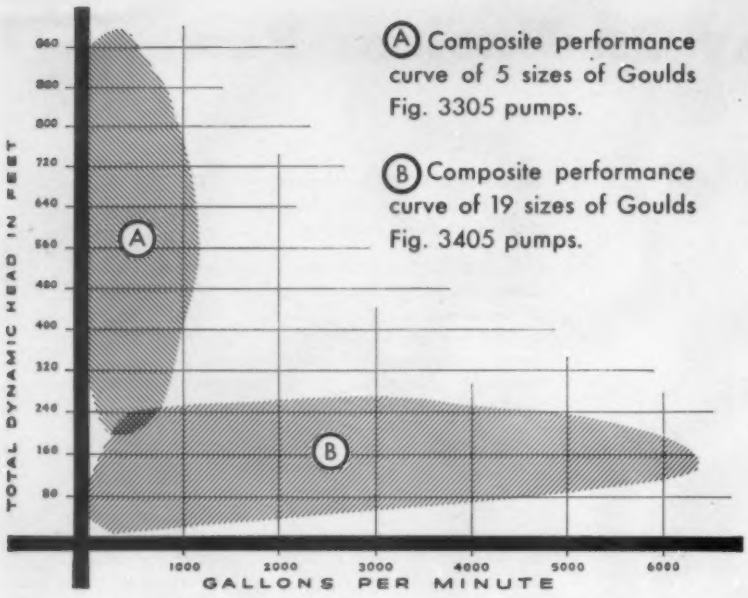
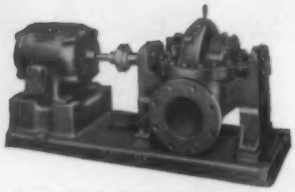


Ⓐ Composite performance curve of 5 sizes of Goulds Fig. 3305 pumps.

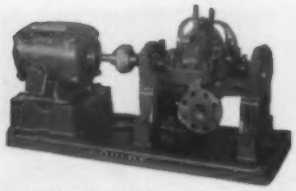
Ⓑ Composite performance curve of 19 sizes of Goulds Fig. 3405 pumps.

Do you need **pumping capacity?**

. . . or head? . . . or both?



Goulds Fig. 3405 single-stage pump.



Goulds Fig. 3305 two-stage pump.

With these two groups of Goulds centrifugal pumps you can meet an extremely wide range of pumping requirements.

For volume pumping, 19 sizes of the Fig. 3405 single-stage, double-suction pump provide capacities up to 6,400 GPM, and heads to 280 ft.

For greater pressure requirements 5 sizes of the Fig. 3305 two-stage pump provide heads up to 1,000 ft., and capacities to 1,200 GPM.

Both of these groups of pumps have important new design and construction features that insure efficient operation and long life. Yet, because so many of their parts are interchangeable, *you can cut your parts inventory in two—or better.*

For example, you need only 3 different shafts for all 24 sizes of pumps in both groups.

We'd like to send you additional details about these pumps, including specifications and performance curves. Just write for Bulletin 721.6 about the Fig. 3405 single-stage pumps, and Bulletin 722.6 about the Fig. 3305 two-stage pumps. We'll be glad to send you copies of both.

MEMBER HYDRAULIC INSTITUTE U.S.A.

Goulds PUMPS INC.

Seneca Falls New York

ATLANTA • BOSTON • CHICAGO • HOUSTON • NEW YORK • PHILADELPHIA • PITTSBURGH • TULSA

For more facts circle 552 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 54)

clean the collectors periodically. Dust falls in to hoppers beneath the collectors, from which it is removed every two months. No attempt is made to reclaim the dust.

Since the installation of the new system, dust has ceased to be a problem in the plant, and work areas remain clean and dust free. In addition, less frequent cleaning of the air conditioning system is required. Formerly, three men each spent seven hours two or three times a month cleaning coils, condensers and filters. The cleaning cycle is now seven weeks, representing a savings of 75 per cent in cleaning time.

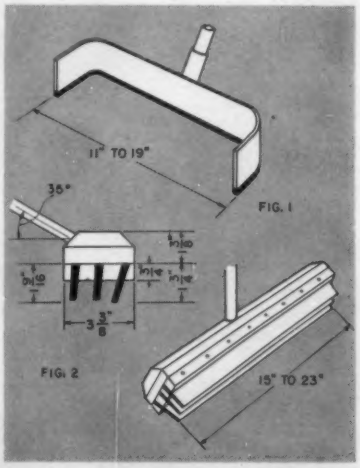
Floor Cleaning Tools

Contributed by Wm. Ordinanz

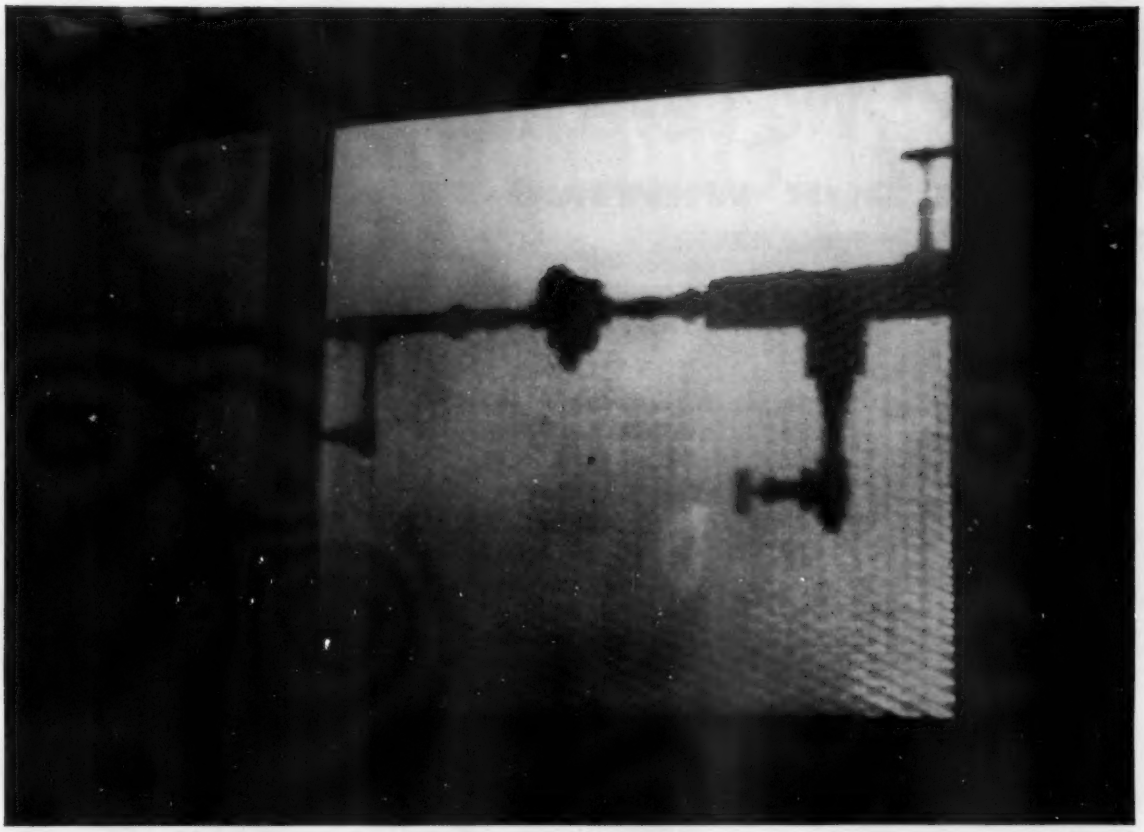
TWO SIMPLE TOOLS that make floor cleaning easier can be constructed in the shop. Both are modifications of the familiar "squeegee," with a strip or strips of rubber inserted into a suitable head. These cleaners will clean and dry simultaneously, when used on a hosed-down floor.

One version consists of a single strip of rubber, fitted into a slot in a head that is formed in the shape of a shallow U. The "wings" on this cleaner confine the water and material being cleaned from the floor.

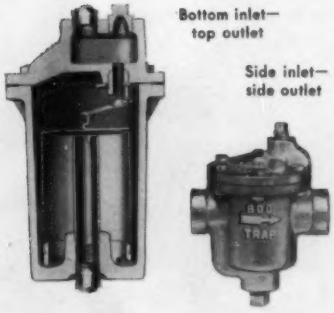
An improvement on the single-bladed cleaner is a three-bladed one, which embodies the advantages of triple wiping action, with less effort on the part of the worker engaged in the cleaning operation.



Sketches of two types of rubber-bladed "squeegees." Dimensions are variable



A Steam Trap Casts a Mighty Big Shadow



Corrosion- and wear-resistant materials; "frictionless" leverage; precision workmanship — add up to LOW MAINTENANCE.

Here are some of the results of retrapping equipment with Armstrongs:

Higher Temperatures. Milk dryer temperatures maintained 100° higher at Rochester Dairy Co., Rochester, Minn.

Faster Heat-up. Oven at pharmaceutical plant heats up 40 minutes sooner.

More Production. 30% more output from cooking kettles at National Cranberry Co., South Hanson, Mass.

Less Fuel. Coal consumption reduced 400 tons annually at A. J. Tower Company, Boston, Mass.

Less Maintenance. 25% less trap maintenance at Hooker Electrochemical Company, Tacoma, Wash.

BIG effects from little traps! And, the effects are multiplied by the number of traps in your plant until they grow to be a major influence upon operating efficiency. Your nearby Armstrong Representative can help you get maximum output from steam heated equipment at minimum cost. Call him, or write:

ARMSTRONG MACHINE WORKS
912 Maple Street, Three Rivers, Michigan

Application Engineered
ARMSTRONG STEAM TRAPS

ASK FOR CATALOG . . .
The 44-page Steam Trap Book gives more examples of how good trapping helps users, tells how to get it . . . selection, installation, maintenance. Free on request — write or call today.

Armstrong traps also cataloged in Sweets and Chemical Engineering Catalog. S55

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"We saved $11,530.00 WITH OUR WHITING TRACKMOBILE"

Trackmobile on its road wheels.

In just *one* year a Trackmobile user saved $11,530 in railway car switching and spotting costs! Their Trackmobile took the place of a locomotive crane formerly used in part for spotting cars and it saved an estimated $2,400 in maintenance costs . . . $6,677 paid for overtime wages . . . $2,453 paid to the railroad company for all intra-plant switching.

How does the Trackmobile make such cost reductions possible? It is far more *efficient* than any other method of switching, spotting and hauling. It travels on *both* track or road, never gets "bottled up" and handles a variety of jobs on different tracks in a matter of minutes. Its operating cost is low. It speeds up freight car movement, reduces demurrage costs, helps increase production!

Important too, the Trackmobile's *initial* cost is surprisingly low!

Write today for complete information!

WHITING CORPORATION
15675 Lathrop Avenue, Harvey, Illinois

Reports from other Trackmobile users

- "Previously used winches . . . now, with the Trackmobile, one man does what it took two to do."
- "Because of its versatility, we make greater use of our trackage."
- "Speeds up unloading facilities."
- "Saves time—no pile up of cars."
- "Saves manhours . . . 100% satisfied."

Trackmobile on its track wheels—ready to couple with railway car.

WHITING

For more facts circle 554 on Reply Card

For more facts circle 555 on Reply Card——→

DOW CORNING CORPORATION

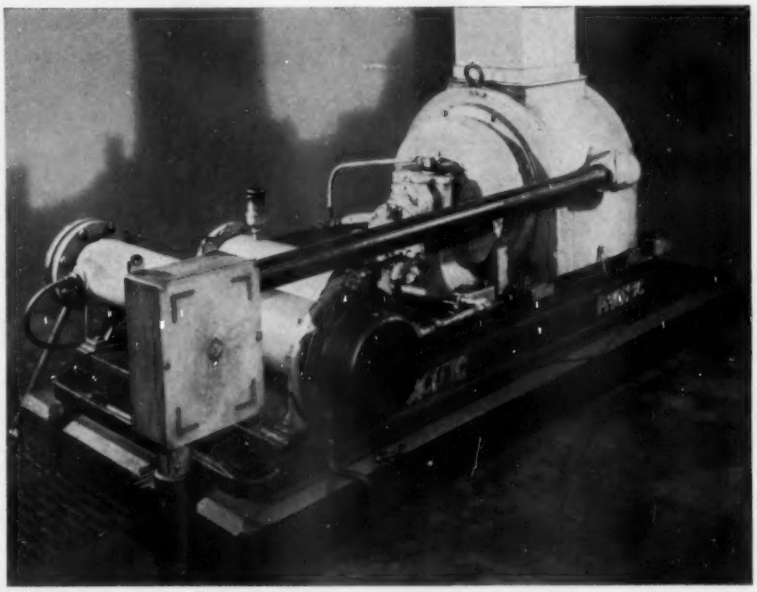
Silicone News

PRODUCTION & MAINTENANCE EDITION No. 6

Daily Lubrication Cut to Yearly With Heat-Stable Silicone Grease

Lubricating the bearings of governor controlled inlet valves on steam turbines used to be a daily routine in the various plants of Consumers Power Company of Michigan. Exposed to temperatures in the range of 480 F, organic greases thinned out, failed to stay in place. Constant relubrication was necessary to keep the valves operating continuously.

After trying all conventional organic greases, Consumers' maintenance engineers found the solution to their problem in Dow Corning 41 Grease. This heat-stable silicone lubricant stays in place; makes frequent greasing unnecessary. After several months' trial, Consumers' engineers feel that a single application of 41 Silicone Grease will satisfactorily lubricate the bearings for at least a year. *No. 55*



INCREASE PUMPING CAPACITY, CUT COSTS WITH SILICONE ELECTRICAL INSULATION

More and more production men are learning that the most efficient and the least expensive way to increase pumping capacity is to have the pump motors rewound with Dow Corning silicone electrical insulation. Take the petroleum industry, for example.

At the Beaumont, Texas, refinery of Magnolia Petroleum Company, a 500 hp motor was used to drive one of the pumps in a 41,500 barrel per day combination unit. Operating around the clock almost every day of the year, the motor was equipped with a heat exchanger for cooling purposes. Despite this safeguard, ambient temperatures ranging up to 120 F caused the motor to fail every other year. Rewinding with ordinary organic insulation cost about $1750, required a minimum of 7 days and reduced through-put.

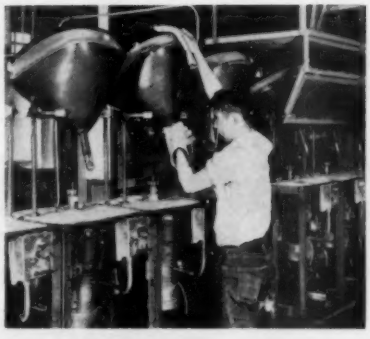
Magnolia production men finally obtained trouble-free performance, however, by boosting the motor's capacity to 650 hp with a Silicone (Class H) rewind job. That was over two years ago and the motor has operated without difficulty since. Its performance and efficiency have been so satisfactory that Magnolia plans to use silicone insulation to increase the capacity of another pump motor from 700 to 850 hp. *No. 56*

Silicone Diffusion Pump Fluids Maintain High Vacuum at Low Cost

To produce an average of over 150 finished television picture tubes per hour, Thomas Electronics, Inc., of Passaic, New Jersey, maintains a production line of some 400 high vacuum diffusion pumps.

When Thomas first began production of picture tubes, organic oils were used in the pumps. But opening and closing the pumps five times every 8 hour shift caused rapid evaporation and breakdown of the oils. Heavy carbon deposits quickly collected in the pumps; expensive and time-consuming cleanings were frequently necessary.

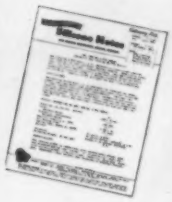
(cont'd pg 2)



DOW CORNING CORPORATION

Silicone News

DOW CORNING PUBLICATIONS ON NEW DEVELOPMENTS AND TECHNICAL DATA . . . .



Silicone based water repellent finishes for above-grade masonry walls repel water and water borne stains; virtually eliminate efflorescence and spalling without plugging the pores or changing the color or texture of masonry surfaces. Easy and inexpensive to apply, such silicone treatments remain effective for years. Over 60 formulators of masonry water repellents made with Dow Corning silicones, are listed in our current "Sources of Supply." *No. 59*

"What's A Silicone?" is the title of a 32 page booklet which answers that often asked question in semi-technical terms. Indexed and illustrated, this booklet has earned an international reputation as the most interesting and informative description of silicones ever published. *No. 60*

Durable protective coatings made with silicone vehicles include white and colored enamels that withstand temperatures up to 700 F; aluminum pigmented finishes which minimize maintenance of exhaust stacks exposed to corrosive atmospheres and temperatures up to 1000 F; and modified silicone-organic paints that offer greater resistance to temperature extremes, weathering, oils and greases. New source of supply list names more than 60 formulators and suppliers of such protective finishes. *No. 61*

"How to Use Dow Corning 44 Grease in the Bearings of Electric Motors" gives suggestions on lubricating open or single shielded ball bearings, double shielded and cartridge type bearings. The recommendations are designed to increase the life of both bearings and motors. *No. 62*

1955 Reference Guide to Dow Corning silicone products packs into 8 pages a brief but comprehensive summary of the properties and applications of the silicone products that are most widely used. Products are indexed by type of application. With increasing importance placed on cost reduction and product improvement, a reference guide to this remarkably stable group of engineering materials becomes more essential to production and maintenance engineers. *No. 63*

SILICONE EMULSION KILLS COOLANT FOAM; INCREASES CAPACITY OF METAL GRINDER

Dow Corning silicone defoamers are probably the most effective and most versatile silicone products ever developed. Originally produced for chemical and food processors, their fame has spread to where practically every industry now uses silicone defoamers to kill foam, save space and increase output.

In a midwest auto parts plant, for example, Dow Corning Antifoam A Emulsion increases productive capacity by eliminating a serious foaming problem with the water and oil coolants used in heavy duty grinders. Recirculated to the working surface every five minutes, the coolants foamed so badly that the grinders were down 15 minutes of every hour while the foam was cleared away. A few ordinary foam inhibitors were effective, but they also reduced the coolant's efficiency.

Four years ago, the parts manufacturer tried Dow Corning Antifoam A Emulsion in the coolant. Foam immediately vanished, "like a punctured balloon," and Antifoam A Emulsion has been used ever since. Only ¾ of a cupful kills foam in the 300 gallon tanks in Mattison grinders. A pint of Antifoam A Emulsion defoams 500 gallons of coolant in the reservoirs of Blanchard tappet finishing grinders. *No. 58*

DIFFUSION PUMP FLUIDS *(continued)*

In 1951, after several successful trial runs, all 400 pumps were converted to Dow Corning 702 Fluid. Evacuation time per tube remained the same but tube output increased because the pumps stayed in service longer. Being semi-inorganic, the silicone fluid cannot break down to form carbonaceous deposits. Cleanings are, therefore, restricted to those occasions when the production line is down for some other reason.

Thomas production men also found that oil consumption rates dropped about 30% with Dow Corning 702. They now replace only five gallons of silicone fluid a month as contrasted to the seven gallons of organic pump oil formerly required each month. *No. 57*

Dow Corning Corporation, Dept. 0504, Midland, Michigan

Please send me: 55 56 57 58 59 60 61 62 63

NAME _____

TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE ____ STATE _____

SILICONE NEWS is published for production and maintenance men by

DOW CORNING CORPORATION

first in silicones

DOW CORNING SILICONES

MIDLAND MICHIGAN

ATLANTA CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D.C. (SILVER SPRING, MD.)

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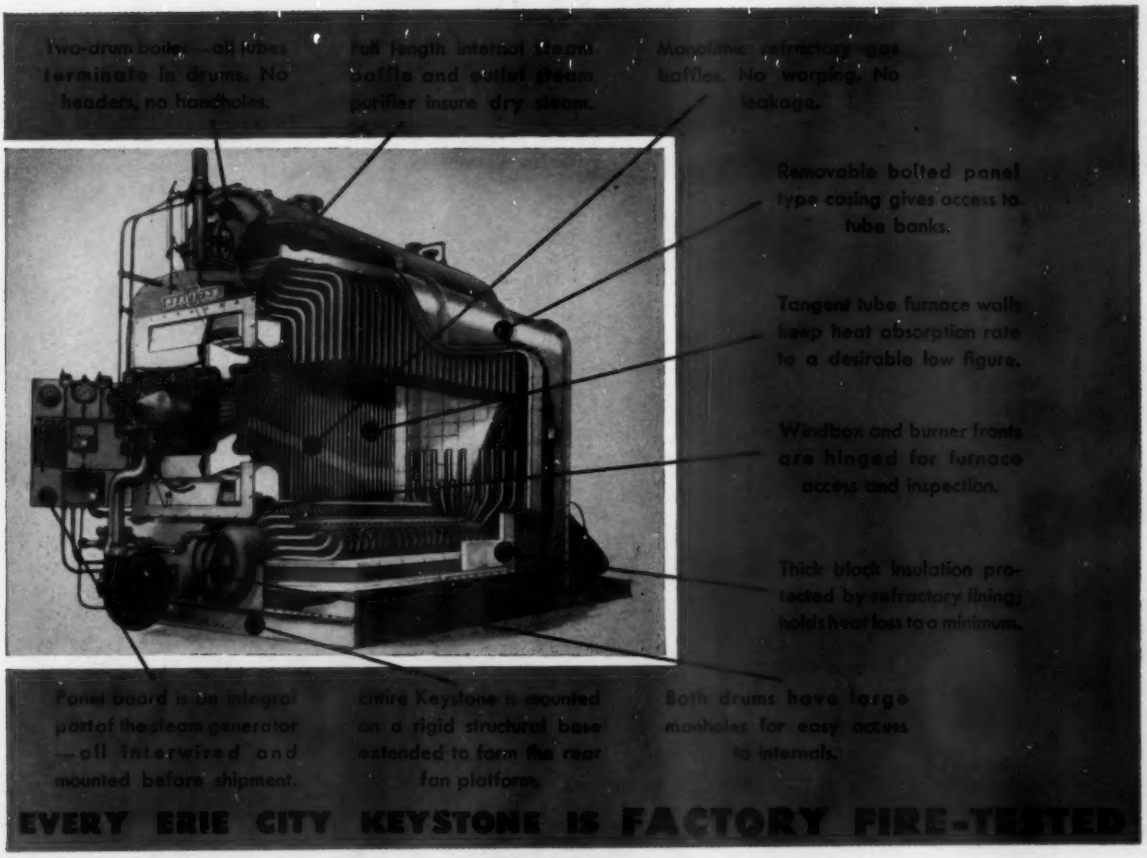
KEYSTONE STEAM GENERATORS

are RELIABLE *and* ECONOMICAL *to operate*

Here's Why

- **5 Sq. Ft. of heating surface per developed H. P.**
- **Fully automatic controls**
- **All piping and wiring at the factory**
- **Ease of installation**
- **Low cost maintenance**


Two-drum boiler—all tubes terminate in drums. No headers, no handholes.
Full length internal steam baffle and outlet steam purifier insure dry steam.
Monolithic refractory gas baffles. No warping. No leakage.
Removable bolted panel type casing gives access to tube banks.
Tangent tube furnace walls keep heat absorption rate to a desirable low figure.
Windbox and burner fronts are hinged for furnace access and inspection.
Thick block insulation protected by refractory lining holds heat loss to a minimum.
Panel board is an integral part of the steam generator—all interwired and mounted before shipment.
Entire Keystone is mounted on a rigid structural base extended to form the rear fan platform.
Both drums have large manholes for easy access to internals.

EVERY ERIE CITY KEYSTONE IS FACTORY FIRE-TESTED

ERIE CITY
115 Years in Steam Generation

You can depend on Erie City for sound engineering

ERIE CITY IRON WORKS • *Erie, Pa.*

STEAM GENERATORS • SUPERHEATERS • ECONOMIZERS • AIR PREHEATERS
UNDERFEED AND SPREADER STOKERS • PULVERIZERS

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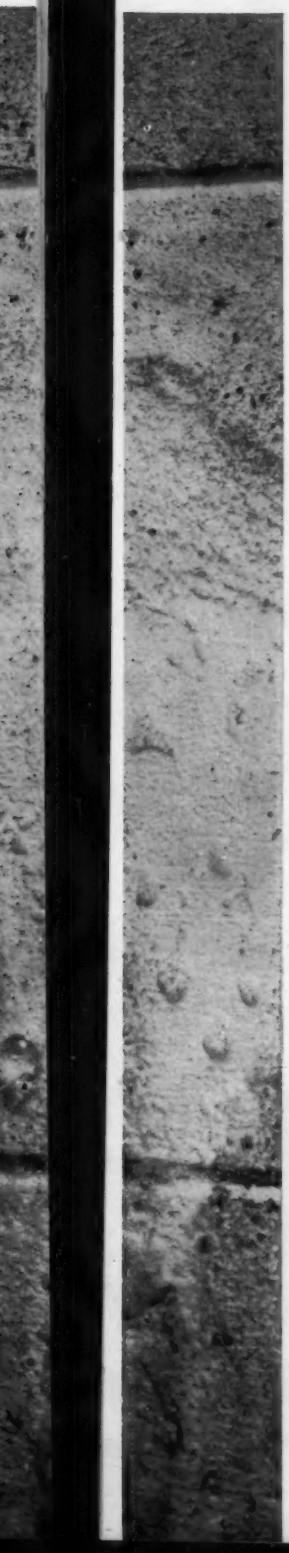
New product combines finish in waterproof,

insulation and durable block



Tough ceramic finish and cellular glass insulation are fused together

Now you can make your insulated walls entirely of glass including the finish on the insulation. You can do it by using a single new product . . . *Duraface* FOAMGLAS. That's Pittsburgh Corning's unique cellular glass insulation intra-fused with a white crust of denser, sealed glass cells.

You can scrub it or hose it down. It's waterproof.

You don't have to worry about fire or vermin. It's completely inorganic.

You can avoid trouble with cracking or bulging of plaster finishes. *Duraface* FOAMGLAS has an integral finish that can't peel or separate. It'll take greater impacts than ordinary finishes.

This remarkable new product may solve *your* insulating and finish problems! Wouldn't you like to see a sample and get descriptive folder? Please use coupon today.

* "Duraface FOAMGLAS" is a trademark of Pittsburgh Corning Corporation.

Pittsburgh Corning Corporation
Dept. PE-45, One Gateway Center
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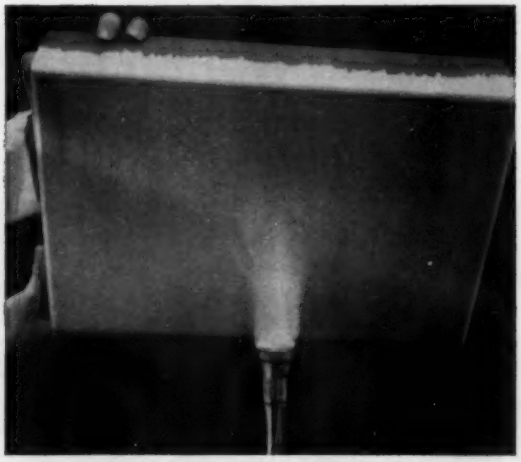

FIREPROOF BLOCKS of *Duraface* FOAMGLAS help protect your plant. They can not burn or transmit fire.

EASY MAINTENANCE is built right in *Duraface* FOAMGLAS. It'll withstand greater impacts than cement plaster finishes. Its integral finish can't blister or peel.

SANITARY WALLS are assured because *Duraface* FOAMGLAS is vermin-proof and moisture-proof. When you wash down the insulation, it stays dry and efficient.

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☐ Please send me a free sample of *Duraface* FOAMGLAS and your new folder with detailed information.

☐ Send engineer to discuss its use.

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Company_____

Address_____

City_____ Zone_____ State_____

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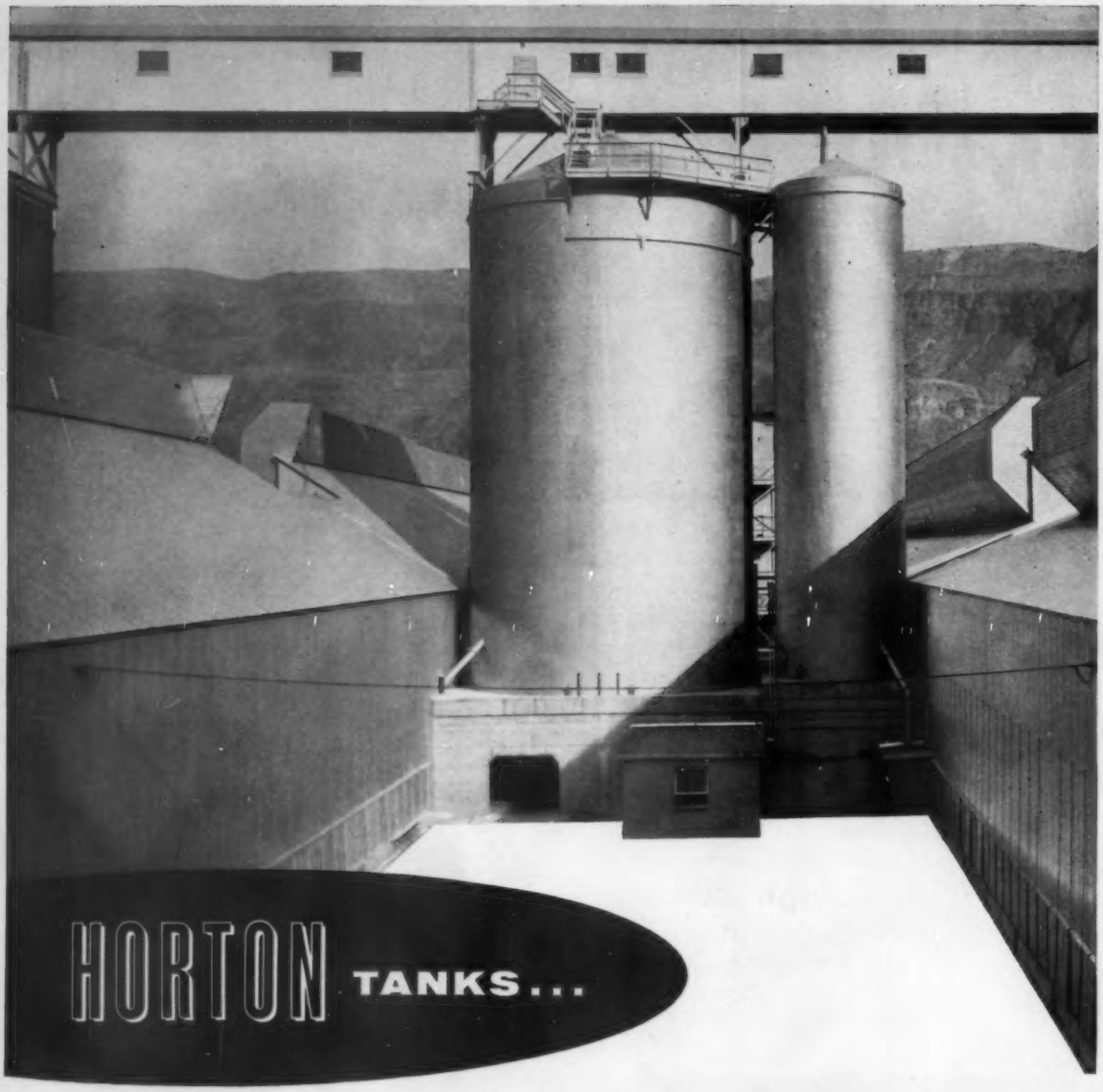

"Very Big" on the Scene at Wenatchee

This scene shows two of twenty-six Horton® welded flat-bottom steel storage tanks at the new Alcoa smelter, Wenatchee, Washington. The tanks are used to store alumina, cryolite, limestone, fuel oil and other materials.

The structures above are typical of the many types Chicago Bridge & Iron Company regularly builds for industrial service. Our plants are completely equipped to design, engineer, fabricate and erect welded steel plate structures to meet *your* specifications. Write our nearest office for further information.

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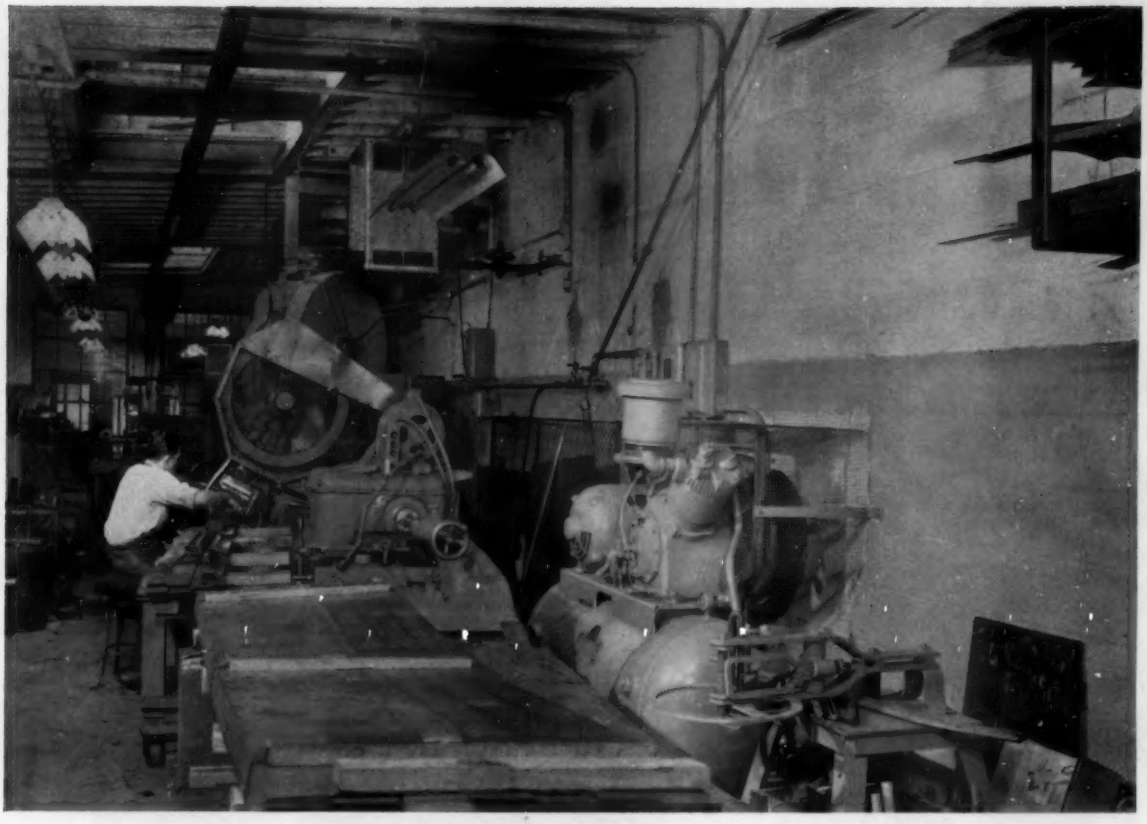

Punching Out Extra Profits

Dependable Westinghouse Air Compressor supplies versatile, economical air power to raise production and lower costs

That's just what the operator of this punch press is doing — punching out the extra profits that result from increased production.

And it's a Westinghouse Air Compressor that's responsible for his greater output.

Why? Because Westinghouse Air Compressors have 15 features not found in any other compressor — features that mean greater dependability and greater efficiency for low-cost operation. Here they are:

Type M inlet filter, disc valves, enclosed crankcase, anti-friction main bearings, pressure lubrication, low oil level protection, enclosed starting unloader, adequate cooling fins, "Y" type construction, high velocity fly-wheel fan, large size intercooler, thermal overload protection, greater weight, dual control, and one-year warranty period.

Let compressed air help you punch out those extra profits with its versatility. And guarantee yourself a trouble-free source of supply by using Westinghouse Air Compressors. Sizes up to 40 hp — write for latest literature.

W-102

LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 14, Wisconsin

PORTABLE AIR COMPRESSORS · TRACTAIR · STATIONARY AIR COMPRESSORS · AIR TOOLS · ENGINES

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Meet U.S. STEEPGRADE

the new Package Belt for steep inclines

No belt was ever better named than the U.S. SteepGrade! Its *new,* exclusive surface design gives positive non-slip control in carrying many materials on descents or ascents as *steep as 45 degrees.* The multiple rows of deep gripper-cleats hold packages and other articles firmly, prevent "avalanches" at critical angles. The ability of U.S. SteepGrade to work at such steep inclines, saves valuable floor space, conveyor length and belt footage. U.S. SteepGrade is the truly modern package belt.

Made by United States Rubber Company from strong, resilient rubber, U.S. SteepGrade's unique deep gripper-cleat design *insures* proper grip and longer wear. Special molding process makes belt and cleats one unit; this exclusive feature prevents gripper-cleats from being torn off by heavy cases. Surface design incorporates self-cleaning action as belt flexes over pulleys—cleans as it flexes!

For more facts about this great new belt, get in touch with any of our 27 "U.S." District Sales Offices or write address below.

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"U.S." Research perfects it..."U.S." Production builds it...U.S. Industry depends on it!

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COURT DECISIONS — a summary of legal findings of interest to the plant engineer

Prepared by Albert Woodruff Gray

Latent Dangers

IN FITTING a grinding wheel to a spindle, a workman in Massachusetts made a bushing to reconcile the spindle to the hole in the wheel. Then he tapped the wheel with the wooden handle of a screwdriver and assured by the clear ring from the wheel stepped aside from the line of the wheel and turned on the power.

The wheel could be safely operated at 5,729 rpm. The spindle onto which it had been fitted revolved at 10,000 rpm. A half minute later the wheel shattered and a fragment hit the eye of the workman. The Federal court said in its affirmance of a judgment against the manufacturer of the wheel,

"One of the universally recognized causes of breakage of a grinding wheel is the extreme centrifugal force to which it is subjected when in operation. This force, of course, increases as the speed of the revolution increases. It follows that the user of the wheel must know its probable safe speed of operation.

"In the face of this fact this manufacturer put into the stream of commerce a grinding wheel whose maximum safe operating speed was below 6,000 rpm without disclosing that information to the user. In view of this omission, what happened here was well within the range of prediction.

"A manufacturer or other person knowing or controlling a thing that is dangerous in its nature or is in a dangerous condition, who deals with or disposes of that thing in a way that he foresees or in the exercise of reasonable care ought to foresee, will probably carry that thing into contact with some person ignorant of the danger, owes a legal duty to every such person to use reasonable care to prevent injury to him."

Patent Infringement

SUIT WAS recently brought by a Georgia manufacturer of electric switches and other automatic electrical devices against an Alabama manufacturer for the manufacture and sale of castings that had neither use nor purpose other than as parts in the manufacture of electrical devices which were an infringement on patents owned by this Georgia firm.

In its decision the Federal Court of Appeals said of the contributory infringement of this Alabama manufacturer, that since that company was closely allied with the infringer of these patents and undoubtedly knew that the castings were incapable of any other use than as part of the devices infringing the patents of these electrical switches and useful only in the switches which the manufacturer knew constituted an infringement, or could be fairly charged with that knowledge, the intent of the company to engage in contributory infringement was presumed as a matter of law and it was liable for these acts to the owner of the patents.

Risk Assumed by Employee

AN ELECTRICIAN at an Oklahoma manufacturing plant used an 18-ft ladder in replacing a roller on an electric line which operated a crane. While working on this replacement

the man fell from the ladder and died immediately.

The representative of his estate sued the plant owner on the ground that the plant had been negligent in permitting this employee to ascend the ladder without the proper tools, a safety belt or protecting scaffold.

In denying this recovery against the plant owner, the court referred to a lawsuit involving similiar circumstances in which it had been claimed that an employer was liable for negligence in permitting the use of a ladder in a small stock crude oil tank by a man who was later found asphyxiated. The same Oklahoma court had said in reference to defective ladders in the decision of that case,

"The ladder belongs to that class of common tools and appliances which the employer is not ordinarily required to inspect and keep in repair. In such cases the employee is as competent to determine the safety of the appliance as is the employer unless the contrary is made to appear. The rule that the employer must furnish safe tools is not applicable where the employee has equal knowledge with the employer as to the safety thereof.

"The employer is not required to inspect simple appliances such as hammers, saws, spades, hoes, lanterns, push sticks and the like, the character and use of which are understood by all alike. A tool of this class is so simple in its construction and so well understood by men of ordinary intelligence that it would seem absurd to say that the employer should make a careful inspection of it before he commits it to the hands of his employee who has the same capacity to understand its capacity and uses that he himself has."

This quotation the court followed with the conclusion, "There must be a causal connection between the negligence averred and the injury suffered and this rule is so well established that it is unnecessary to support the same by authority. There can be no presumption of negligence from mere proof of the accident."

Damages for Nuisance

OWNER OF A 50 acre tract of land in Texas sold four acres of the tract for the construction and maintenance of a gas compression plant. The seller was assured by the purchaser that this plant was to be constructed over a thousand feet from her residence and that it would create no discomfort or annoyance.

The noise and vibrations together with the deposits of water vapor from the operation of this plant became a nuisance and destroyed all the enjoyment of the former owner of that land in her remaining property.

She sued for damages from not only the personal annoyance and inconvenience but for the depreciation in value of her property. The plant owner in his defense maintained that the former owner had lost any right to damages as the price she had received for the land included whatever claims she might have otherwise have had for this annoyance and depreciation.

The court in its decision against this plant owner said, "The facts of this

COURT DECISIONS

case take it without the rule that one who has licensed a nuisance may not recover damages which flow from its exercise. The offensive noise and vibrations were not necessary incidents of the operation of the plant. It is not the knowledge of the fact that a plant is to be constructed but knowledge of the objectionable consequences which would estop the grantor.

"This grantor did not know or appreciate the effect of the erection and use of the plant and she did not have reason to believe or foresee that it would be a nuisance for the nuisance could be only established by actual operation."

Damages for Loss of Profits

AN ILLINOIS manufacturer contracted for the manufacture by a die maker of two progressive dies, intending them for use in making 750,000 sets of plugs and flanges under a contract with a can company supplying the army with gasoline cans. The plugs and flanges were to be delivered, beginning three months later, at the rate of 150,000 a month.

The decision to use progressive dies which stamp out the product from raw material by a continuous operation, was an experiment, since no dies of this character had been made by this die plant. The dies when delivered were imperfect, the plug die off 40 to 50 thousandths of an inch.

An attempt by the die maker to overcome this variation was made without success and this manufacturer, with no notice to the die maker, made the same attempt on its part. Under the contract with the can manufacturer 250,000 plugs and flanges were delivered, 50,000 rejected and the contract canceled as to the remainder.

When the die maker sued for the agreed amount for the manufacture of these dies the purchaser set up a counterclaim for $130,000 as damages, for the loss of profits from the failure to deliver the dies.

A judgment denying the manufacturer a recovery of these lost profits was affirmed by an Illinois appellate court with the statement in relation to the recovery of lost profits from a failure to deliver, that the party at fault, to be liable for such a loss, must have understood and consented to assume such a liability when the contract was made. Here the only notice of the purpose for which the dies were to be made was merely a memorandum on the order showing the dies were to be used in the performance of a government contract.

That memorandum, the court said, was by no means a sufficient notice to show that such a loss of profits, of $130,000, was under consideration when this order was accepted.

"If the manufacturer of these plugs and flanges contemplated any such liability," said the court, "it was its duty to make it an express part of the contract or to have given express notice of its intention to hold the die maker to that measure of liability."

Secret Manufacturing Process

OWNERSHIP OF a secret process was claimed by a Louisiana corporation for the manufacture of iron pentacarbonyl, a liquid used in the manufacture of motor fuels and finely powdered iron. The corporation licensed the use of this process to a California manufacturer with the provision that the process should be held a secret by this licensee. Later the California corporation became bankrupt and its machinery, equipment and all the technical data were acquired by a New Jersey corporation.

The Louisiana corporation sued to have this New Jersey company held a trustee for these processes, to account for its profits and to pay the Louisiana corporation $1.50 a gal for all pentacarbonyl produced.

The Federal court said in denying the right of the Louisiana corporation to this belief, "The proper rule of law is that an inventor has no exclusive right to the use of his unpatented process but rather his sole right is to prevent anyone from obtaining such process through breach of trust."

Recovery for Damaged Machine

UNDER A conditional sale agreement a machine was shipped to a Pennsylvania buyer from the manufacturer's plant in Minnesota. The buyer paid the manufacturer $705.24 on the purchase price before the arrival of the machine. The machine when it was offered for delivery had been badly damaged in transit.

After extended negotiations in which, according to the Pennsylvania court, the manufacturer "did nothing to repair or replace the machine except promise, avoid and suggest," the manufacturer repossessed the machine under the contract and the purchaser sued for the money it had already paid under the contract and for the freight and storage charges.

The manufacturer insisted that these amounts could not be recovered since the buyer had failed to return or offer to return the machine. The court in disposing of this feature of the defense said, "Considering the size of the machine, the distance to the manufacturer's plant and the circumstances of the case the buyer was not under the duty to return the machine."

Escalator Clause

A STEEL manufacturing company agreed to furnish, erect and paint all structual steel work in the erection of a building. The agreement contained a clause permitting an increase in price in the event of increases in the price of "component materials, labor rates applicable to the fabrication of, erection thereof and freight rates," in effect on the date of the execution of the contract.

During construction the steel company increased the price of the steel it was furnishing for this building. The owner protested, contending that this escalator provision did not permit an increase by the steel company on the price of its own steel. The increase in cost that would justify an increase in the contract price, it maintained, was an increase in the cost of materials entering into the manufacture of the steel and not the steel itself.

The steel company contended that the meaning of this phrase, "component materials," was steel, paint and the like that entered into the fabrication and the erection of the building and not the cost of items entering into the manufacture of the steel itself.

In its decision of the action by the steel company the court said, "The contract was for furnishing, erecting and painting structual steel work. The 'component materials' of such work would be steel, the paint and other materials used in erecting the steel. It would hardly mean the numerous raw products from ore to blast furnace entering into the making of the steel.

"Furthermore, the labor rates applicable to the fabrication and erection of the component materials clearly meant labor rates applicable to the fabrication and erection of the structural steel on the job and not labor rates of steel production alone. We conclude that the escalator clause in its entirety related to the erection job, not the manufacture of steel."

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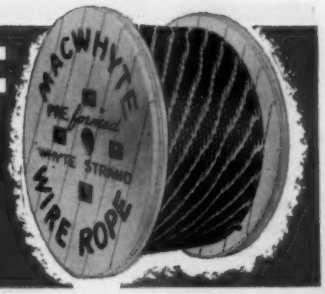

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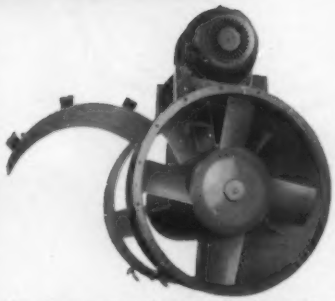

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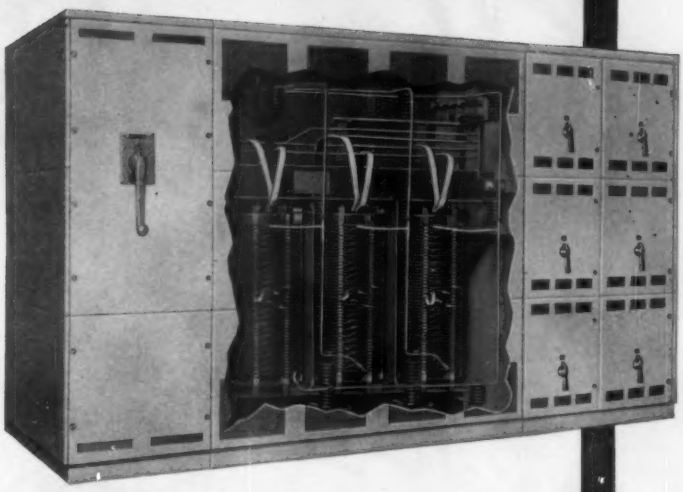

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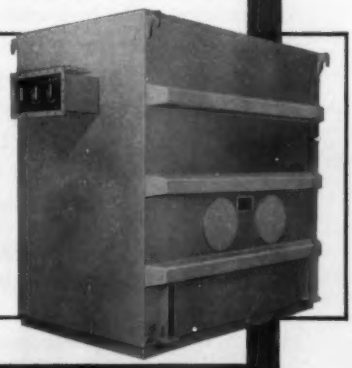

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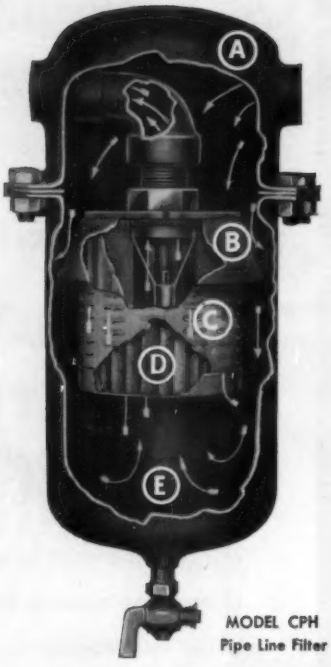

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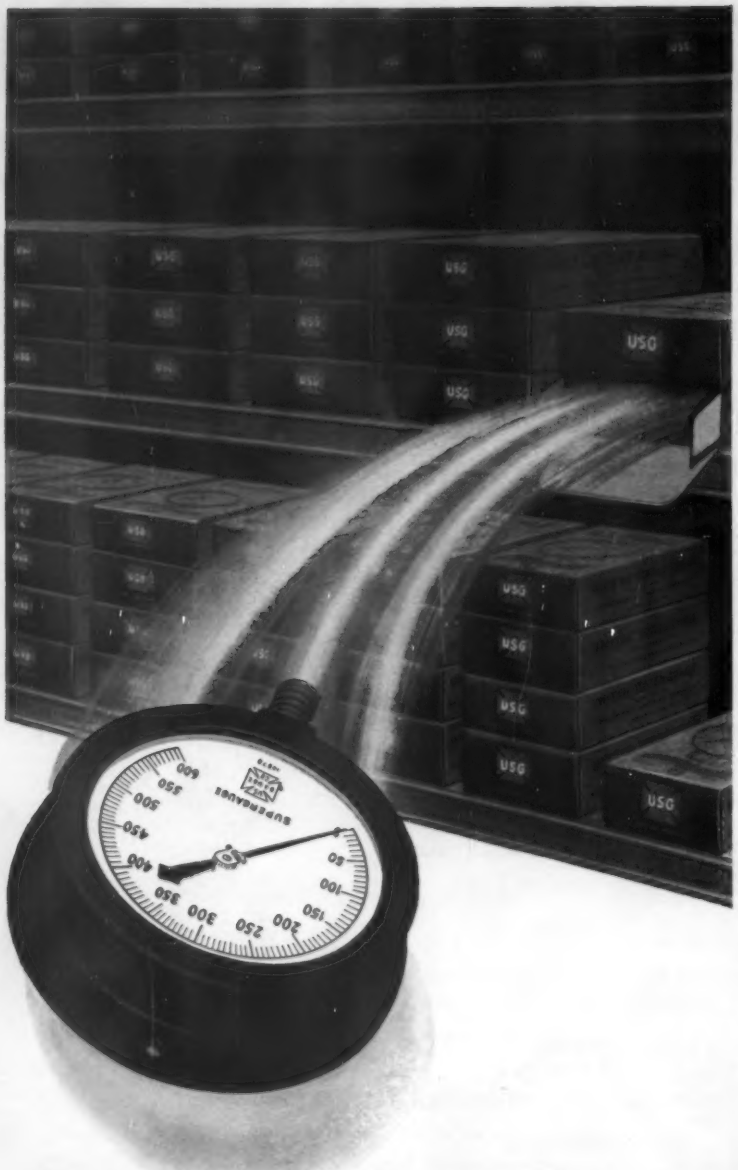

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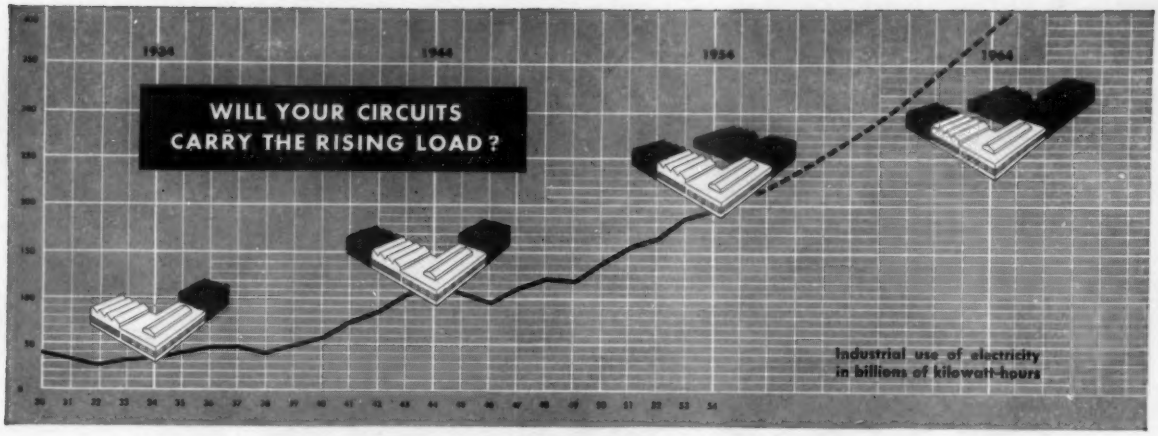

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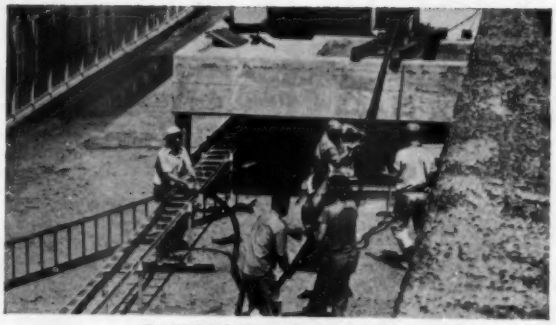

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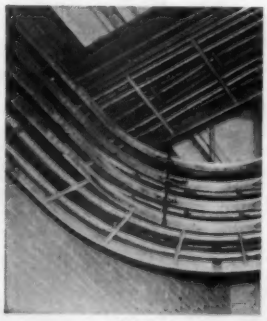

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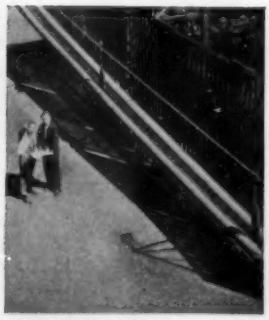

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Plate Burning—

How Steel Warehouses Can Help the Plant Engineer

By J. G. BALDWIN, Manager, Work Order Dept., J. T. Ryerson & Son, Inc., Boston

AN OLD ADAGE SAYS that there is nothing new under the sun, and this well applies to the subject of plate burning; but the methods of cutting steel by gas burning have advanced so much in recent years that many an application for gas cutting goes begging for lack of up-to-date information. The plant engineer, more perhaps than any other person, should be well informed on this quick, easy, and inexpensive way of producing steel parts.

Figure 1, a machine base frame, gives some indication of the scope of the burnt plate field. Steel plate up to and including 8 in. thick, which is readily available from warehouse stocks, may be cut by ordinary gas cutting torches. This means that almost any imaginable shape of plate may be ordered for delivery within a matter of days. When one realizes that the cutting tolerance may be 1/16 in. (depending on thickness, size, and shape), and that the cost is nominal, many applications come to mind.

Fig. 1. This is a good example of the potentials in the plate-burning process for making special shapes. The item produced, in this photo, is a machine base frame

If the plate is to become a finished part such as a cam or gear, the amount of machining required will be very small. In many cases parts formerly machined finished for appearance may be used as cut, since present equipment and methods produce a burnt cut that is very smooth and square and close to size.

Burnt plate has become readily available on an economical basis due to the great improvement in machines which have been developed by manufacturers of plate burning equipment. Figures 2, 4, and 5 show the more common types of equipment used in plate burning. Figure 4 is a Travograph type machine which, in addition to having movable arms, as was the case in the older type machines, is itself movable since it is mounted on rails. This machine can cut a plate 10 ft. by 10 ft. or it can cut up to 8 smaller size pieces simultaneously by the use of multiple torches. Many of the later type machines such as the one shown are actuated by an electronic head.

Figure 2 is a smaller pantograph type machine being actuated by a magnetic head or a tracing head; and Fig. 5 is a small, portable Radiograph unit used for circular or straight line cutting. These machines are used by the steel warehouses and steel fabri-

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All the photographs used in this article were taken in the work order departments of Joseph T. Ryerson & Co., Inc. The author, Mr. Baldwin, states that all readers of Plant Engineering are welcome to visit the Ryerson installations.—Editors

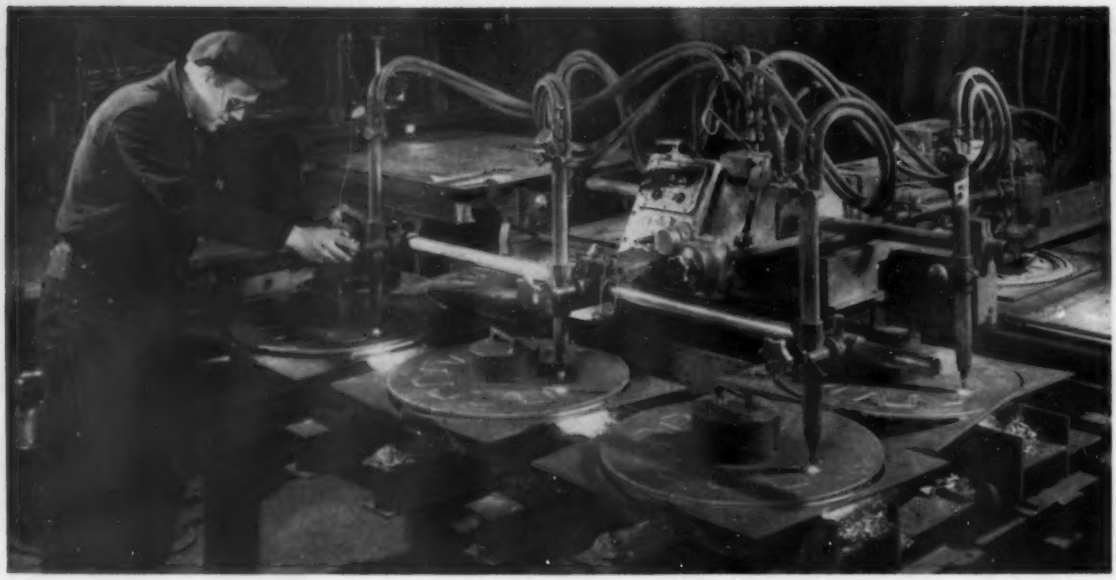


Fig. 2. One of the smaller pantograph type machines. The unit can be actuated by either a magnetic head or a tracing head

cators or job shops which are sources of supply for burnt plate or by a manufacturer who has a production requirement of plate burning.

Burning machines with electronic operating mechanisms are relatively new and are fast replacing the older machines which required a sample or raised pattern as a guiding device. The electronic head machines operate by means of a ray of light which follows the edge of a white outline on a black background or vice versa. Therefore, a white paper template may be made which is simply placed on a black background and held in place by covering with a glass plate or other transparent material.

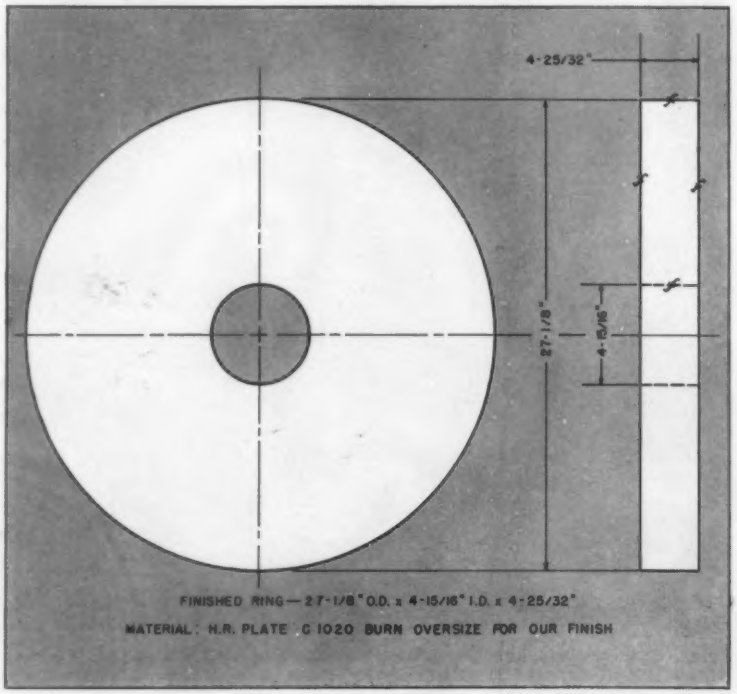
The electronic guiding mechanism follows this template with phenominal accuracy and transmits this shape to the several burning torches of the machine. The magnetic head controlled machine has a revolving pointer which magnetically follows a pattern. A tracing head uses gears to follow the edges of a raised pattern.

These newer type machines will produce a sketch plate of far greater accuracy than the older type machines. The work of the "electric eye" machine is especially accurate, and in addition, the template work required with this machine is much simpler. In the plate burning operation the torch cuts a slot commonly called a kerf from the plate material.

Since the electric eye directs the center of the torch or torches, the template must be made oversize by one half the amount of the kerf which varies with the thickness of the plate being cut. Paper templates usually can be made in a matter of minutes and may be used indefinitely on production runs or filed for future use on repeat orders as there is no wear involved.

With the exception of the large manufacturer who has a production requirement of burnt plate, plants will not have sufficient demand to justify the capital expense of large plate burning machines nor will they want to stock the various sizes of plate that may be needed in relatively small quantities per size. Therefore, the matter of template making, and other details of burning operation may be left to the supplier of burnt plate. Many of the steel warehouses are well equipped to serve the trade with this commodity.

Fig. 3. This is just a sample of the type of information needed in sketch form when ordering a plate-burning job done by a steel warehouse or job order shop



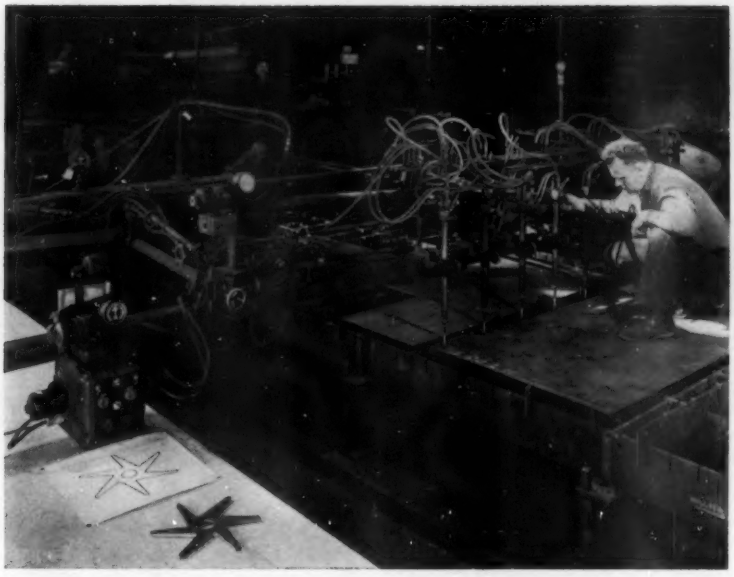


Fig. 4. Above is a Travograph type of plate burning unit. In addition to having movable arms, the entire unit is movable inasmuch as it is mounted on rails

When ordering sketch plates, rings and discs, one need only to give size or include a dimensioned drawing or print. See Fig. 3. A sample or template is not required. However, it is well to have the order fully describe what is needed. For instance, it is helpful to have the customer give the machined size of the burned plate parts being ordered rather than to order the burned plate size making his own oversize allowance for machining. In any case the order should state burned dimensions or machined dimensions. If only a part of the piece is to be machined such as one side, it would be helpful for the buyer to supply this information also.

Since it is impossible to produce a perfectly dimensioned part by burning, it is well to arrange to have the bulk of the tolerance discrepancy take place where it will be least objectionable. Furthermore, if the order gives machined dimensions, it is the responsibility of the supplier to furnish a product as little oversize as possible, thus reducing customer's machining time. As stated above, the accuracy of plate burning depends upon thickness, over-all size, and shape.

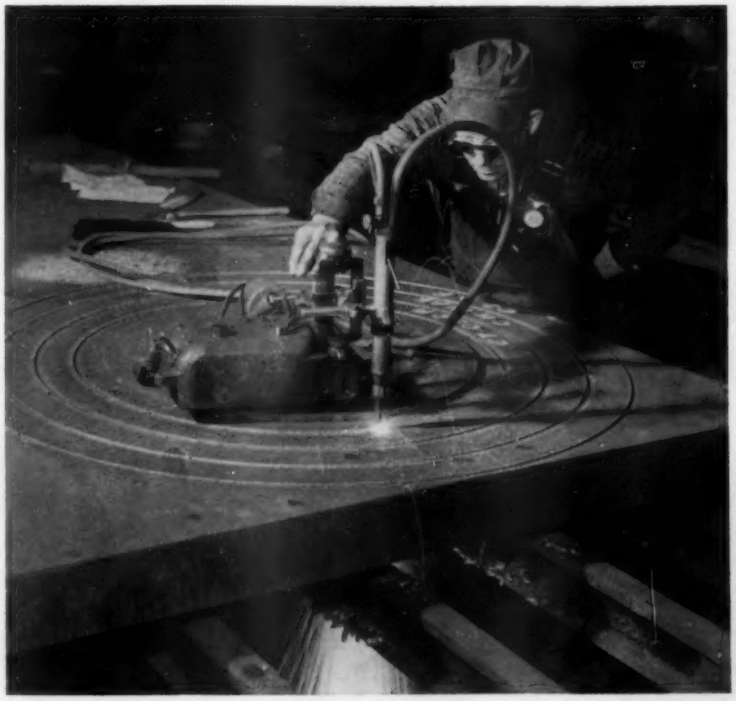
Cutting of a rolled steel product releases inherent stresses and this in some cases may cause an appreciable amount of distortion. In plate thicknesses under ½ in. resulting deformations from cutting are more prominent and for this reason no advanced generalized tolerance figure on cutting should be given. This reasoning is especially applicable to light gauge material having unsymmetrical cut-outs. However, where close accuracy is required on such questionable work, template changes after experimental cuts can be made which may compensate for any pronounced distortion so that close tolerances can be maintained on the work.

When ordering rectangular cut plate up to ¾ in. thickness, the customer may have a choice of a sheared or burned edge. Plate shearing deforms the edge somewhat and in this respect the burned edge is preferable. On the other hand the heat of burning may cause a slight bowing of the plate. Where extreme flatness is desired, a trial of both types of cutting is recommended. Rectangular torch cutting of very narrow widths in relation to length should be avoided where possible. A considerable bow is apt to take place over the length of the piece.

Comments thus far made apply to ordinary low carbon (1020 analysis) open hearth steel plate. The same burning practices apply to free machining (1117 or similar analysis) steel plate and to the medium carbon (1045 analysis) steel plate. However, the burned edge of the higher carbon steels will air harden and should be stress relieved by heat treatment before any machining is attempted. Normally, the low carbon steels are not heat treated after the burning operation, although manufacturers of precision parts may require normalizing for the neutralizing of the inherent stresses of the material from the rolling operation.

The plant engineer, who is so frequently called upon to handle the unusual or emergency job, may find a quick solution to some of his steel problems by a greater use of burnt plate. Frequently a burnt plate section can eliminate the added cost and delay of a casting or a forging.

Fig. 5. Small, portable Radiagraph machine which can be used for either straight or circular figure cutting. Note accuracy of circles and smoothness of outline



New Central Control System—

Actuates Many Off-On Operations Without Special Wiring

1. Cost One Department Store $8000; Saved It $8300 First Year
2. Cut $1000 per Month Off One Hotel's Monthly Demand Rate
3. Will Switch Lights; Start-Stop Motors; Open-Close Valves
4. Performs 40 of These Off-On Operations on Schedule

ELIMINATING THE TIME lag in the "on" and "off" operation of its lighting system alone is saving a Milwaukee department store more than $8000 per year.

A Texas hotel has reduced its electric demand rate by more than $1000 per month. The hotel had one peak period during the day. It was a heavy-load, short-duration operation. It was determined that, by proper programming of other operations to shut them off during the peak period, enough load could be discontinued to equal the heavy demand period peak.

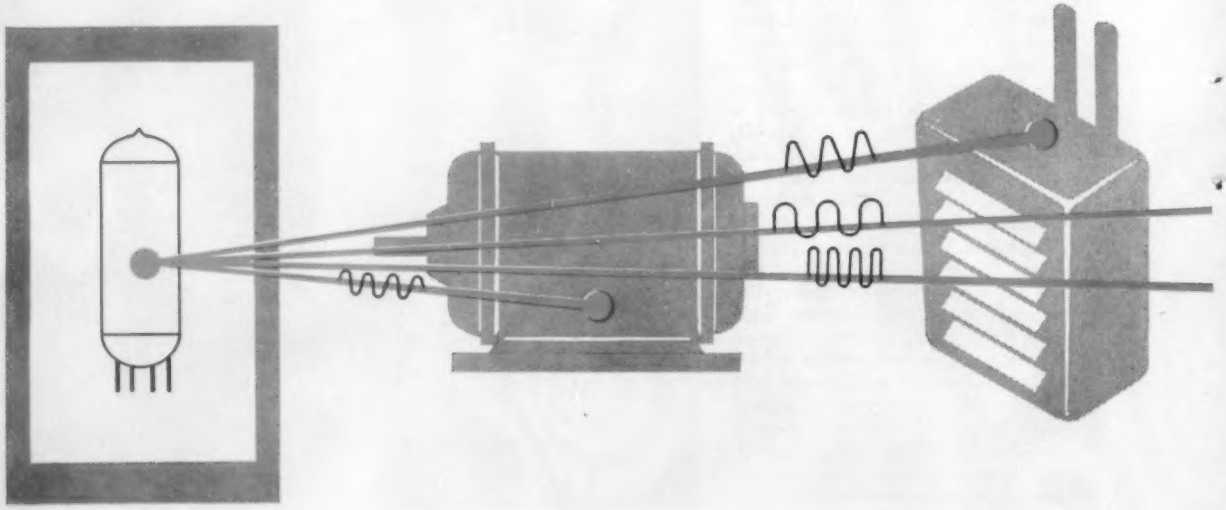
The savings, in both these cases, was made possible through employment of IBM's latest development, a central control system that requires no special wiring. The system is described as a "dependable, electronic remote control system that will operate as many as forty on-off functions such as switching lights, starting and stopping motors, opening and closing valves, turning heating systems on and off, controlling ventilating systems." All of this without special wiring—wherever 60 cycle power is available this method of automatic programming is possible.

Simple in character, the system involves only a few basic elements; a central operations panel, transmitter, and coded relays are the system's major components. Carrier currents are used for "command" signals and are initiated by the central operations panel, through the transmitter, and are imposed on the 60 cycle wiring. Transmitted to the coded relays in the system the carrier command signal affects only those relays it is intended to operate.

These relays consist of a simple electronic receiver and a unique electromechanical decoding mechanism. The decoding mechanism is capable of distinguishing between any one of ten "off" and ten "on" codes transmitted on the same frequency. Load and control switches are added to the relays for convenience and safety. The load switch serves as a means of manually switching operational units on or off at the relay. For instance, lights may be switched on or off at times other than those programmed without going to the central operations panel. The key-operated control switch is used to make the load switch inoperative to prevent unauthorized switching. It is also used as a safety switch to "lock out" pre-programmed command pulses from the central operations panel when it is necessary to work on the circuit controlled by the coded relay.

Here's how the control system could be programmed to direct operations in an industrial plant.

7:00 AM—A command pulse is transmitted over the plant's electrical system. It's coded for the relay which operates the plant heating system. All other relays reject the pulse. The heat-



L. W. Bradley and J. J. De Matteis, planning engineers of the manufacturers of central control system, point out features of one of the vital parts of control

ing system relay accepts it, the relay operates, and the heat is turned up.

7:15 AM—A second pulse goes out to start motors in compressor units in the plant.

7:20 AM—Ovens are fired out in the plant and the glue pots are heated.

7:30 AM—A pulse goes out to the relays which control the lighting system. The lights go on in corridors and locker rooms; ten minutes later another pulse is sent out and the general lights go on in the main plant.

7:40 AM—The program sends out a pulse to operate electrical switches on heat-treating equipment.

7:55 AM—Power is turned on in the circuits that service the machine tools on the plant floor.

8:00 AM—The starting whistle's relay identifies its special "command" pulse and the whistle sounds. Meanwhile the employees have punched their time cards on the attendance recorders whose correct time, as well as that of the plant wall clocks, is governed by the control system's master clock.

Noon—Another pulse goes out to the whistle to signal the lunch break.

And so on, throughout the day. Other services—for instance, pumps to circulate fluids, and valves to direct their flow—are programmed to operate, as needed, throughout the day. At the end of the day commands again go out to the heating system, ventilators, lights and pumps, automatically setting them to their night time conditions. The protective system and plant's outdoor sign are turned on.

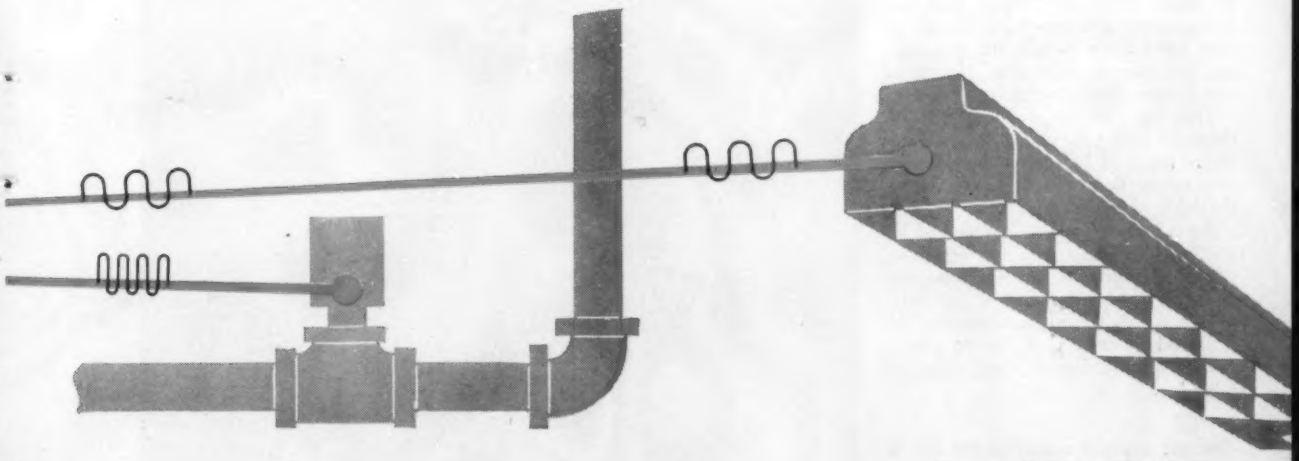
Source of the system's directions or commands is the central operations panel, shown in the accompanying photo. For proper timing and scheduling of commands it is equipped with an accurate master clock and program control. Through its relays and an electronic transmitter, the command pulses are sent to the coded relays in the system for operation of electrical services.

Installed on the hinged panel door are cycle, circuit-selection, and inactivating switches; bull's-eye type light indicators; and a channel selector. A bull's-eye indicator is associated with each circuit to indicate the on-off status of the circuit. When the indicator light is lit, an "on" command has been transmitted over the circuit. When the indicator light goes out, an "off" command has been transmitted.

Inactivating switches provide a ready means for making any programmed circuit inoperative to prevent transmission of command pulses normally scheduled for a circuit.

Want More Information?

If you want more information on this "Central Control System" just drop a line to the Editor, Plant Engineering, 110 S. Dearborn St., Chicago 3, Ill. Or use one of the postage-paid cards elsewhere in this issue.



Telescoping Leg Tilts Bandsaw Table

Instant, Precise Angle Changes Made While Saw Is In Motion

BY EQUIPPING a Do-All bandsaw table with a telescoping leg that enables operators to change cutting angles precisely and instantly, Temco Aircraft Corp. is saving 1½ manhours a day on one machine.

By extending or contracting the adjustable leg, an operator can make cutting angle changes while the saw is in motion. This is particularly valuable in sawing variable contours.

It was possible to cut variable contours with the Do-All, but it was a three-man operation. The operator actuated the saw blade and guided the material. One assistant called out the degree change, using a level and protractor, and a third man supported the table and moved it from one position to another. By making degree-changing on the saw not only a one-man but a one-handed operation, the telescope leg saves an average of 1½ manhours a day on one machine.

Form Block-maker W. D. Smith developed the leg expressly for the saw in the form block section. This particular machine is required to cut ever-changing angles in aluminum, steel, masonite, Parkwood and other form block materials.

Before Smith's degree-changer was installed, a friction lock had to be loosened while the table was adjusted by hand. Now, the friction lock remains in one position—tight enough to take some table weight off the new leg, but not so tight that the table won't move when the leg is telescoped.

The leg consists of a length of threaded drill rod which fits inside a sleeve made of 1¼-in. tubing. Dowel pins secure the leg to the base and to the table of the saw.

An adjusting wheel is attached at a convenient height on the leg. The wheel has a threaded hub which meshes with the threaded drill rod. A turn on the wheel, therefore, telescopes the drill rod in or out of the stationary tubing, lengthening or shortening the table leg.

One and one-half manhours per day is saved by this wheel that has turned contour cutting into one-man operation

Fan Connections—

Both Inlet and Outlet Design and Conditions Are Important

By **WILLIAM E. TRACY**, Midwestern Regional Application Engineer
Sturtevant Division, Westinghouse Electric Corp., Chicago, Ill.

INDUSTRIAL FANS have a history almost as long as that of manufacturing processes. In fact, were it not for fans and their inherent ability to pick up and exhaust man-made industrial contaminants, many of our modern and ingenious manufacturing processes could not exist.

While equipment devices have been developed comparatively recently to remove air contaminants that damage manufacturing machinery, the installation of fans and exhaust systems has always had as its major objective the protection of the worker. Today, ever increasing emphasis is being placed on the reduction of various occupational hazards in order to reduce lost time, increase efficiency and upgrade plant working conditions.

There has certainly been no lack of ingenuity or engineering progress on the part of fan manufacturers in the development of fans with vastly improved efficiencies. The day is long past when the matter of fan selection was simply a matter of referring to the performance tables of the paddle-wheel type fan, the only type in existence. While this latter type fan is still suitable for certain applications, new blade designs have increased air handling efficiencies above 90 per cent.

Fans But One Component

Regardless of improved design and efficiencies, however, the centrifugal or axial flow fan is only one of two basic components of a successful plant supply or exhaust system. The second component consists of hoods, ducts and collectors in a contaminant exhaust system or louvres, filters, coils, ducts and distributing grilles in a ventilating system.

A simple but complete description of a fan may be found in its characteristic curves relating the volume of air delivered to the pressure rise and the driving horsepower required. Briefly, the pressure is relatively high when the volume delivered and horsepower required is a minimum. As the volume delivered increases the pressure drops and the horsepower required increases.

Another description of the system may also be found in its characteristic curve. The resistance to the flow of air through a system is generally parabolic and accordingly when the volume flow is zero the resistance to flow is zero. As the volume of flow increases, the resistance increases as the square of the volume increases, or in the form of a parabola.

These two components are separate and distinct from each other and yet they must operate together. A review of the above two paragraphs will indicate that the volume-pressure curve of the fan will cross the volume-pressure (resistance) curve of the system at one common point. This point will satisfy both the fan and the system.

This is the point that the plant engineer attempts to calculate when he designs his system. This is also the point at which the fan engineer will make his apparatus selection. Notice that the responsibility of defining the system point of operation is that of the plant engineer. Likewise, the responsibility of selecting the proper size of fan belongs to the fan engineer. When both parties have been accurate in their engineering, and the equipment is installed in accordance with good practice, the system will function as designed. This has been proved by many thousands of installations throughout the years.

Occasionally, however, installations are found which are not functioning as designed. A review of these cases has indicated that many times the type of duct connections to and from the fan has been responsible for these discrepancies. Normally, a fan is tested with straight line air flow entering the inlet or leaving the outlet. Air entering or leaving the fan in a different manner may affect its performance seriously enough to reduce the performance of the system.

It is impossible to predict accurately the exact effect of these poor connections because of many factors, such as air velocty, density, type of fan inlet, type of connection, etc. without extensive laboratory work. The analysis and application of such data is too complicated for practical use and any such review can only be done on a qualitative basis. Accordingly the data given here reviews in general terms the "do's" and "don'ts" of fan connections.

Literally speaking, a poor outlet connection does not affect the fan performance because the work has already been done on the air. A poor outlet merely adds more resistance to the system than has been or can be calculated. This means that the system curve will cross the fan curve at a point other than calculated and accordingly the performance of the two will be other than that desired. For the purpose of this article, it is convenient to consider the poor outlets as affecting the fan performance.

How Demonstrator Helped

A demonstrator was recently assembled to visually illustrate the effect upon fan performance of inlet and outlet connections. A standard representative blower was set up in accordance with the Test Code (Bulletin No. 110) of the National Association of Fan Manufacturers. Characteristic curves of the fan were plotted on a chart. Various types of connections to and from the fan were then attached, noting the effect upon the performance. A review of these will be helpful to the plant engineer to eliminate possible discrepancies in the performance of a fan and the system to which it is connected.

A very common outlet connection is illustrated in Fig. 1. An elbow placed immediately at the fan outlet is poor practice and should be avoided. Since the air is leaving the wheel in the direction of rotation, an elbow placed in such a manner would tend to "bend" the air back on itself, thus creating a dynamic loss in addition to the normal frictional loss. This dynamic loss cannot be predicted as it depends upon the outlet velocity, air density, elbow radius, etc. Figure 2 illustrates the effect of such a poor elbow upon the fan performance. Note that both the volume and pressure (Point A) are different from that calculated. The horsepower has also decreased, Point B.

(Text continued on page 94; for illustrations, see following page)

Fan Outlet Connections

Fig. 1. An elbow placed immediately following fan outlet is bad practice

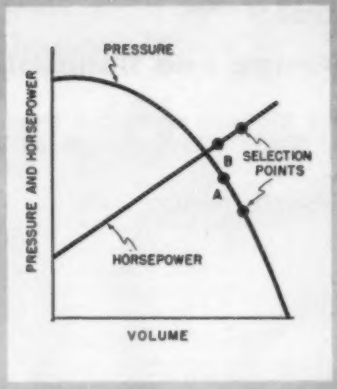


Fig. 2. These curves show the effect of installing an elbow as in Fig. 1

Fig. 3. Installation like this, with fan rotated, may solve problem, Fig. 1

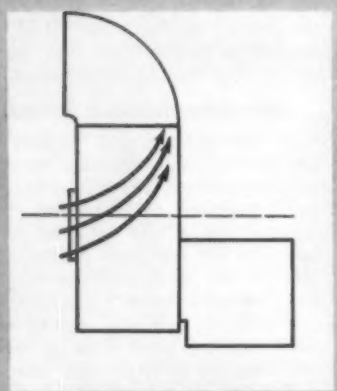


Fig. 4. In set-up like this air must reverse itself, creating dynamic loss

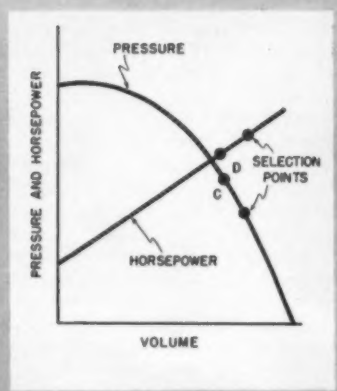


Fig. 5. Volume, horsepower and static pressure of Fig. 4, is shown

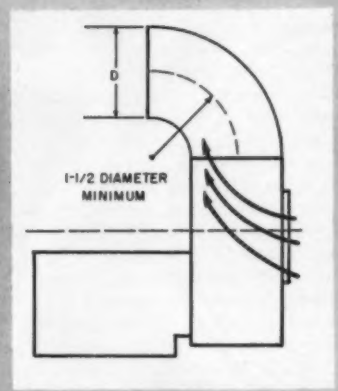


Fig. 6. Correct installation of unit in set-up similar to that in Fig. 4

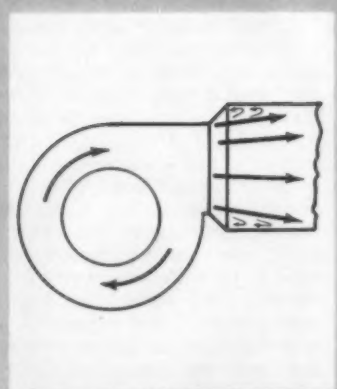


Fig. 7. Incorrect duct connection. Abrupt expansion creates turbulence

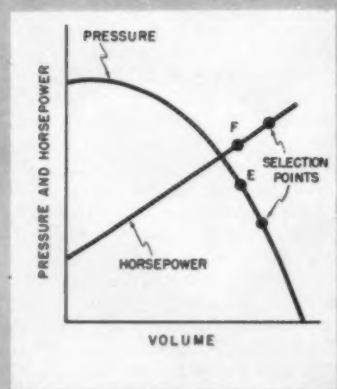


Fig. 8. Performance curve of installation, Fig. 7, shows energy loss

Fig. 9. Energy loss is cut by increasing length of duct-fan connection

Fan Inlet Connections

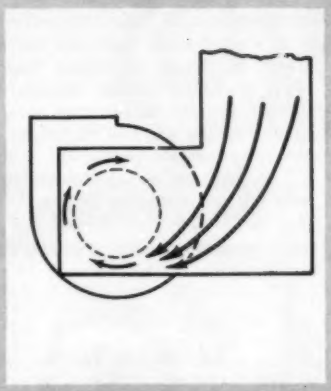


Fig. 10. Without inlet vanes, on rectangular duct, air will pile up

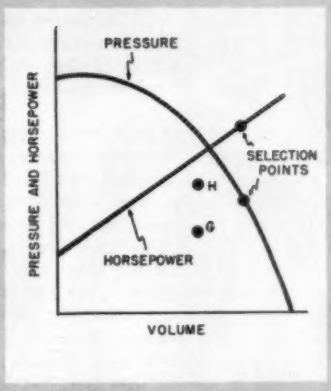


Fig. 11. Fan characteristics chart shows result of inlet like Fig. 10

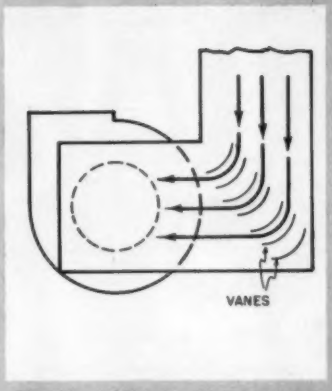


Fig. 12. Addition of inlet vanes to inlet box corrects troubles in Fig. 10

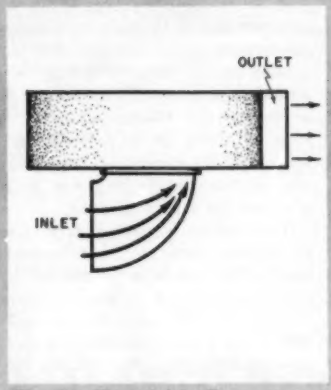


Fig. 13. Short inlet elbows may result in condition shown by arrows

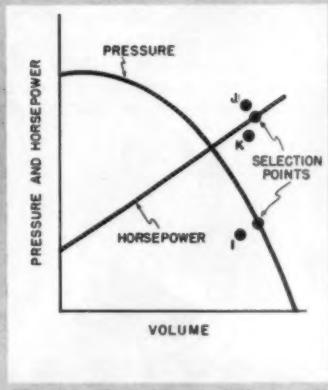


Fig. 14. Fan characteristics resulting from installation shown in Fig. 13

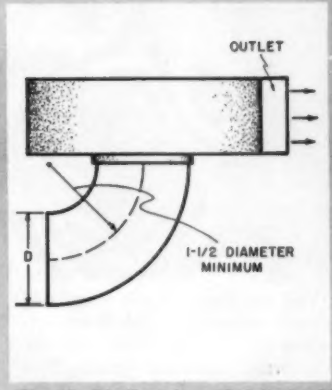


Fig. 15. If elbow is needed it should be no shorter than 1½ pipe diam

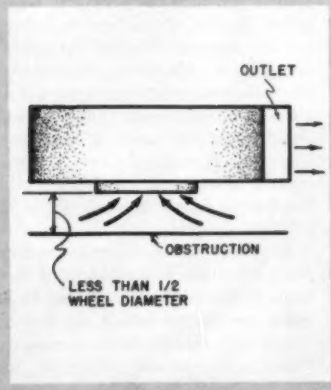


Fig. 16. Obstructions, such as post near fan inlet, cut down air flow

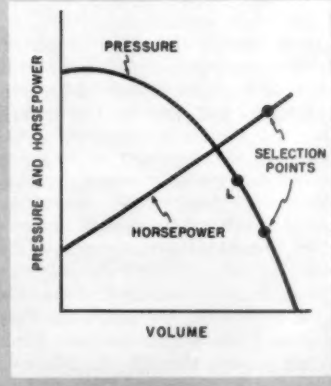


Fig. 17. Obstructions too close to fan inlet can cut volume, static pressure

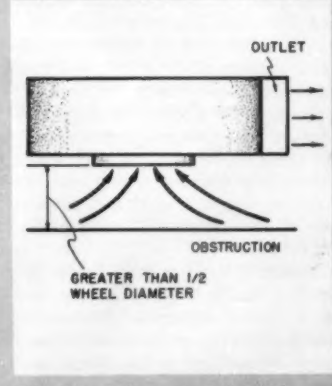


Fig. 18. Rule out obstructions as close as ½ wheel diam from inlets

(Text continued on following page)

condition, it is much better to place the elbow five to 10 pipe diameters away from the fan. Sometimes this is impossible due to local conditions. A second suggestion is to rotate the fan housing 45 deg in order that a 45 deg elbow is all that is required. If an upblast fan is required, then a change in the direction of rotation of the fan may be wise as illustrated in Fig. 3. An elbow with a minimum centerline radius of 1½ pipe diameters is also advisable. Such an elbow will bring the fan performance very close to the fan characteristic curves. If a rectangular duct with a sharp radius is still necessary, the installation of properly designed vanes in the elbow will eliminate the dynamic losses.

How Flow Is Affected

It is sometimes necessary to place an elbow on the fan outlet which guides the air to one side or the other. As air enters the inlet of a centrifugal fan, it changes its direction 90 deg to emerge from the blades of the wheel. Since air has mass, its momentum tends to crowd it towards the back plate of the wheel. If an elbow is required as shown in Fig. 4, the air must reverse itself thus creating an additional dynamic loss. The volume and static pressure will be as illustrated by Point C in Fig. 5. The horsepower, Point D, will also be lower on the curve, indicative of these losses.

One simple solution to the problem is to move the elbow five to 10 pipe diameters away from the outlet of the fan. The air flow, by this time, will have straightened and the losses encountered through the elbow will approach normal calculated figures. If it is necessary to install the elbow at the fan, perhaps an arrangement similar to that shown in Fig. 6 may solve the problem. Here the direction of rotation of the fan has been changed. The air flow patterns from the fan outlet are not disturbed. The centerline radius of the elbow however should be at least 1½ pipe diameters.

Under these conditions, the resistance through the elbow will approach the normal frictional resistance which can be easily calculated. Again it may be necessary to maintain a short radius with rectangular duct work and proper vaning at the elbow will reduce the dynamic losses.

Occasionally the fan will discharge into a duct that is larger than the fan outlet. Figure 7 illustrates the incorrect method of duct connection. A loss of energy occurs due to the abrupt expansion between fan outlet and the duct, and turbulence occurs at the sides of the duct. This loss of energy varies as the difference in the square of the velocities and may be illustrated on the performance curves, Fig. 8, as: Volume, Point E; horsepower, Point F. A large amount of this energy loss may be regained by increasing the length of the connection piece as indicated in Fig. 9. For maximum regain of energy the included angle between the top and bottom or sides of the connection piece should be no more than 15 deg. Any greater angle will reduce the amount of energy regain.

Only the effect of poor outlets upon fan performance have been reviewed. Consider now the effect of poor inlets. Generally speaking, poor inlet conditions will be much more serious. Basic test codes require straight air flow into the fan inlet (as is the case with a straight duct connected to the fan inlet) or that the air enter the inlet freely and without being influenced by any obstructions at the inlet. If such is not the case, the air may have a spin as it enters the inlet, thus changing the basic design conditions and reducing the fan performance.

Occasionally an entrance piece is made up as illustrated in Fig. 10. A rectangular duct, offset from the fan inlet, will connect to the inlet by means of a 90 deg elbow and a straight rectangular piece. A hole, the size of the fan inlet, will be tapped into the side

of the duct connection. There are various reasons for such a connection and they sometimes cannot be avoided. Since air has mass, it will tend to flow in lines as indicated by the arrows. Note that the air is piling up at the bottom of the duct and is obviously not entering the inlet in straight lines. The air will tend to spin around the inlet as illustrated by the small arrows drawn around the circumference of the inlet.

Note that the direction of rotation of the air entering the inlet is the same as that of the wheel rotation. Since the air passing through the inlet and entering the blades of the wheel is already rotating in the direction of the wheel, the amount of energy which the wheel can impart to the air is reduced. Consequently, the volume of air delivered and the pressure rise through the wheel is less than with straight air flow into the inlet and wheel. The horsepower required to drive the fan is also lower. Figure 11, Point G, volume and Point H, horsepower, illustrates the effect of such a connection upon the performance. It should be noted that the effect of the connection depends upon the air velocity, amount of spin and density of the air, and therefore, cannot be accurately predicted.

The addition of inlet vanes to the inlet box as illustrated in Fig. 12 will help straighten the air flow and thus reduce the losses. The inlet box cross-sectional area should be from 10 to 50 per cent larger than the fan outlet area for minimum losses.

Adjustable Vanes

As a matter of fact, the industry has taken advantage of this characteristic of reduced performance and horsepower with the development of inlet vane controls. These vanes are adjustable triangular pieces of sheet steel so arranged in the fan inlet that they deliberately induce a spin to the incoming air. These vanes may be positioned either manually or automatically to reduce the volume or static pressure or both to any predetermined value. At the same time a corresponding decrease in horsepower required to drive the fan is realized.

This device is particularly effective in process work, as a constant weight device for combustion air or forced draft applications in power plants. It should not be used in atmospheres which are sticky, extremely dirty, erosive, or corrosive.

Sometimes the entering duct connection will be similar to that described above with the exception that the air will be given a spin counter to the wheel rotation. In such cases, the volume and static pressure will fall below the fan characteristic curve but the horsepower required to drive the fan will be above the curve. Extra work is required to straighten out the air flow which accounts for the higher horsepower. If such a condition is encountered, steps similar to those described above can be taken to bring the fan performance back to its characteristic curves.

At times it becomes necessary to place an elbow immediately at the fan inlet. This is necessary due to local space conditions which do not allow a straight inlet duct arrangement. There are numerous cases in which the radius of the elbow is extremely short, similar to that shown in Fig. 13. Under these circumstances it will concentrate at the far side of the elbow

(Continued on page 208)

How Padlocks Are Used To Protect Maintenance Men

Giving maintenance and repair men their own padlocks is recommended practice. A man repairing or checking a machine simply turns the switchbox lever to "Off" and locks the lever in place with his padlock. Since only he has the key to that padlock, no person can turn on the machine until the repairman removes his padlock. When two or more persons are repairing a machine, the multiple padlock clamp shown permits each man to use his own padlock. In this way, the switch can't be turned on until the last man has removed his padlock. According to the National Safety Council, failure to provide switchbox protection during repair operations constitutes a major threat to the safety of the industrial maintenance man.

PADLOCKS and KEYS—

How To Plan Systems for Protection of Industrial Plants

By WILLIS A. MEYER, Service Manager, Master Lock Co.

WHILE PADLOCKS are often associated with burglary protection, there is a growing awareness of the part these padlocks can play in protection and accident prevention in factories, shops, and plants.

Inside the plant, tool cribs, tool boxes, supply cupboards, employees' lockers, and electrical switchboxes are a few of the many places where padlocks can play a useful role.

Outside the plant, padlocks are used for fence gates, window guards, storage tanks, warehouses, garages, fuel oil lines, coal bins, incinerators, storage buildings, and power line control boxes.

Yet as the need for and use of padlocks for industrial purposes becomes more widespread, there is a corresponding need to relate these many individual padlocks into a smooth-working protective system, and to control the many padlocks and keys used in a modern industrial plant.

In working with plant engineers, and foremen, our company has found that a padlock protective system must meet these basic requirements:

1. The system must meet the particular padlock needs or requirements of the individual plant division, or department.

2. It must fit in with the general measures adopted by the plant or company for safety or protection purposes.

3. It must provide control of keys to prevent unauthorized persons from tampering with the system.

To meet these needs, we supply padlocks (according to the special or particular use intended) in eighty different styles and sizes, and in two fundamental distinguishing types of keying systems—"master-keyed" and "keyed-alike"—as well as the commonly known individually keyed padlock.

Each individual padlock in the master-keyed system has its own separate key that fits only that one particular lock and no other. Yet, by special preparation of the padlock cylinder in manufacturing, it is possible to provide a master key which will open every lock in the system.

Thus, for example, there may be 100 men in a tool room, each with his own tool box protected with a padlock. Each man has a key which opens

Foolproof Padlock Protection for Electrical Equipment

1. Make each worker responsible for his own safety by providing him with his own padlock, either combination or key-type. This is the only airtight method of insuring positive protection, recommended by the National Safety Council.

2. Issue only one key for each lock. The supervisor, however, should keep a master list of key numbers, and the extra key to each lock in his department. But the extra keys should never be loaned out for any reason. Keep extra copies of combinations, where combination padlocks are used, in the hands of a single supervisor.

3. If a supervisor uses the extra key during emergencies, the old lock and extra key should be destroyed and replaced. This precaution eliminates the possibility of the original key turning up and removing the safety padlock at the wrong time.

4. Check to see that no two locks and keys are the same. Best insurance against duplicate locks and keys is to purchase padlocks made by a reputable manufacturer.

5. The company should purchase all padlocks for its employees, rather than let them supply their own. This insures high quality padlocks such as the laminated pin-tumbler type, that cannot be opened or broken.

6. Establish a careful clearance policy when two or more workers, or departments are involved. Faulty clearance systems often cause casualties even though every man has his own padlock.

7. Require each man to attach his own padlock to a switch control, even though it is already locked. (Steel tongs should be attached to switchboxes to accommodate more than one padlock. This can consist of two pieces of ⅛-in. metal with the necessary number of padlock shackle holes.)

8. Impress each employee that even though someone else has already locked the controls, he will not be protected unless he attaches his own padlock.

9. Prevent men going off a job at the end of a shift from removing their locks until those on the next shift have attached their locks.

10. Identifying individual padlocks is suggested in large plants where the controls may be some distance from the operation under repair.

only his own padlock. But the foreman can have a master key which opens all of the one hundred padlocks. See the accompanying diagram.

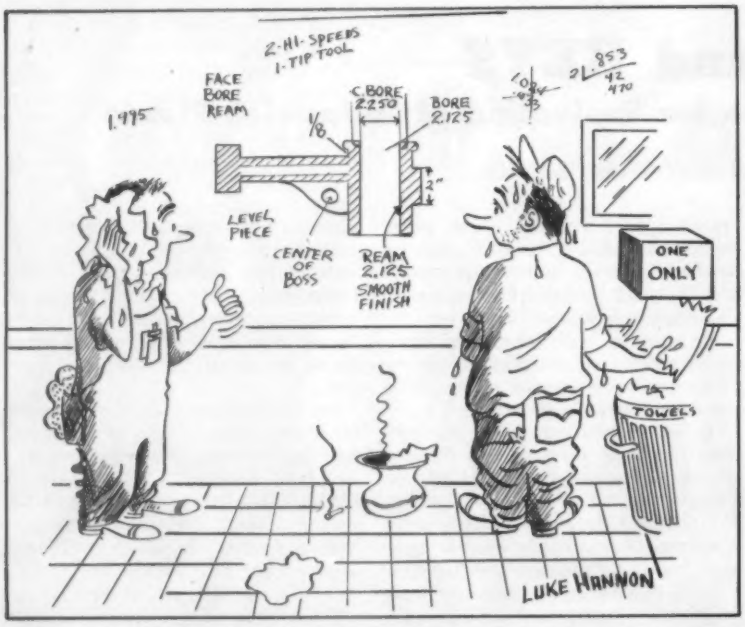
Master-keyed systems can be further broken down into "sub-master-keyed" and "grand-master-keyed" systems. The sub-master keyed system refers to padlocks which are master-keyed in sets—for example, twenty-five padlocks for tool boxes, fifty padlocks for switchboxes, and so on. Each set has its own master key, so that the tool box master key opens only the twenty-five tool boxes, and the switchbox master key opens only the fifty switchboxes.

The grand-master-keyed system refers also to padlocks which are master-keyed in sets. But in this case, a grand-master-key can open any padlock, regardless of which set the padlock is in.

In the keyed-alike system, the keys are identical for all of the locks in that system. For example, say six men in a certain department must have access to thirty boxes of padlocked equipment. The thirty padlocks for this equipment are furnished with the same key change. Each of the six men then has his own key; all the keys are alike; and all will open the thirty padlocks.

In some circumstances, it's advisable and convenient to combine master-keyed and keyed-alike systems. For instance, there may be five padlock groups. Each group is keyed alike, but each has a different key change from the other group. Yet one master key will open each padlock no matter which group it is in.

Frequently tool cribs are padlocked to prevent unauthorized removal of company tools. In many cases, each crib requires but one padlock, with perhaps a quantity of keys, one for each person permitted access.



"The guy spent three hours in here figuring the job, then went out and scrapped it in three minutes."

Locker Room Applications

If individual tool boxes are company property, it is possible to have each padlock keyed separately from the others, sub-master-keyed for the convenience of the department foremen, and grand-master-keyed into the protection system for the plant as a whole.

Generally, employee lockers can best be protected by master-keyed padlocks. In this way, the locker occupant has only the key for his particular padlock. Yet the supervisor has the master-key to enter any locker in case of emergency.

Such emergencies may come up if the worker locks his key inside, if he forgets his key at home, if security measures call for check of the locker's

contents, or if the employee is dismissed and fails to turn in his key for the locked padlock.

The key-controlled combination padlock is ideal for locker protection. Each combination padlock responds only to its own combination. A key opening in the back of the lock permits the supervisor, who has a control key, to open the lock without dialing the combination.

In one instance, the Master Lock Company supplied six keyed-alike laminated padlocks for the tool crib in a large Midwestern plant, sixty-five padlocks under sub-master-keyed Group A for the tool boxes of sixty-five men in the tool room, 750 padlocks under sub-master-keyed Group B for all plant employees, and seventy-five padlocks all keyed-alike for switchboxes.

The tool room foreman had only the sub-master-key for Group A. The plant superintendent had only the sub-master-key for Group B. And the plant personnel manager held the grand master key which could open any of these 896 Master padlocks specially ordered as an over-all installation.

In another case, a large industrial plant ordered twenty-four master-keyed laminated padlocks for its shopping department, with head shipping clerk holding the sub-master-key; 108 master-keyed padlocks for its foundry division under a second and separate sub-master key system; and thirty-six keyed-alike padlocks for its other general factory purposes; but with only eight keys for its maintenance and supervisory men to hold.

Starting with the outside gates, a general practice is to have all the padlocks keyed-alike so that the watchman or attendant can open or close all of them with just one key. Sometimes that particular set of locks is also made part of a master-keyed set.

For window guards, inexpensive keyed-alike sets offer an ideal solution. Warded-type locks generally are adequate, for security itself is not the prime consideration. The locks primarily keep the guards in place to help prevent accidental breakage of the glass.

For Materials Handling, Too

Still another application of padlocks is to lock the garage doors or sectional doors on pick-up or delivery trucks. Where each man is responsible for the contents of his particular truck, individually keyed locks are necessary. Where the trucks are operated as a fleet, with drivers taking them out at random, a keyed-alike setup is ideal, since any driver's key will fit the lock of any of the trucks.

Extra-length shackles are often necessary depending on the particular type of door closure. Chain attachments help prevent the locks from being put down and forgotten, or to keep them from dropping into snowbanks or mud.

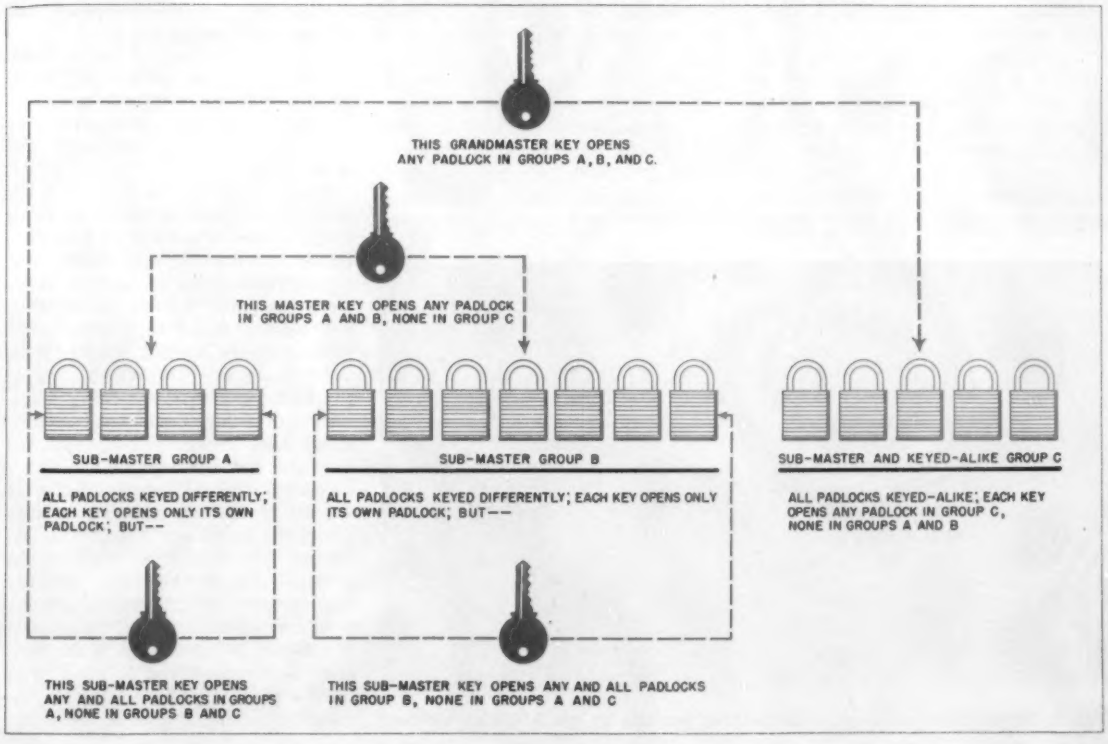
A ten-point protection plant (presented on the preceding page) which will enable maintenance men to "lock out" electric switchboxes, is based on a recent National Safety Council technical data sheet concerning methods of preventing such accidents.

The danger stems from the fact that switchboxes control power to electrically driven machines. Thus, the possibility exists of a control switch, physically remote from a machine being turned on while a maintenance man is repairing that machine. The National Safety Council says this is a frequent cause of injuries and deaths in industrial maintenance.

Avoiding this type of electric switch hazard is a puzzling problems. Companies trying such methods as posting warning signs and removing fuses have failed to prevent accidents. Somehow, someone throws on the switch while repairmen are still at work with resulting casualties.

The Safety Council reports that such methods as posting warning signs or removing fuses have generally proved ineffective. They assert that padlocking switchboxes "is the only positive protection measure."

Graphic explanation of the manner in which the master-keyed and keyed-alike padlock protection systems work


THIS GRANDMASTER KEY OPENS ANY PADLOCK IN GROUPS A, B, AND C.
THIS MASTER KEY OPENS ANY PADLOCK IN GROUPS A AND B, NONE IN GROUP C
SUB-MASTER GROUP A
ALL PADLOCKS KEYED DIFFERENTLY; EACH KEY OPENS ONLY ITS OWN PADLOCK; BUT--
SUB-MASTER GROUP B
ALL PADLOCKS KEYED DIFFERENTLY; EACH KEY OPENS ONLY ITS OWN PADLOCK; BUT--
SUB-MASTER AND KEYED-ALIKE GROUP C
ALL PADLOCKS KEYED-ALIKE; EACH KEY OPENS ANY PADLOCK IN GROUP C, NONE IN GROUPS A AND B
THIS SUB-MASTER KEY OPENS ANY AND ALL PADLOCKS IN GROUPS A, NONE IN GROUPS B AND C
THIS SUB-MASTER KEY OPENS ANY AND ALL PADLOCKS IN GROUP B, NONE IN GROUPS A AND C

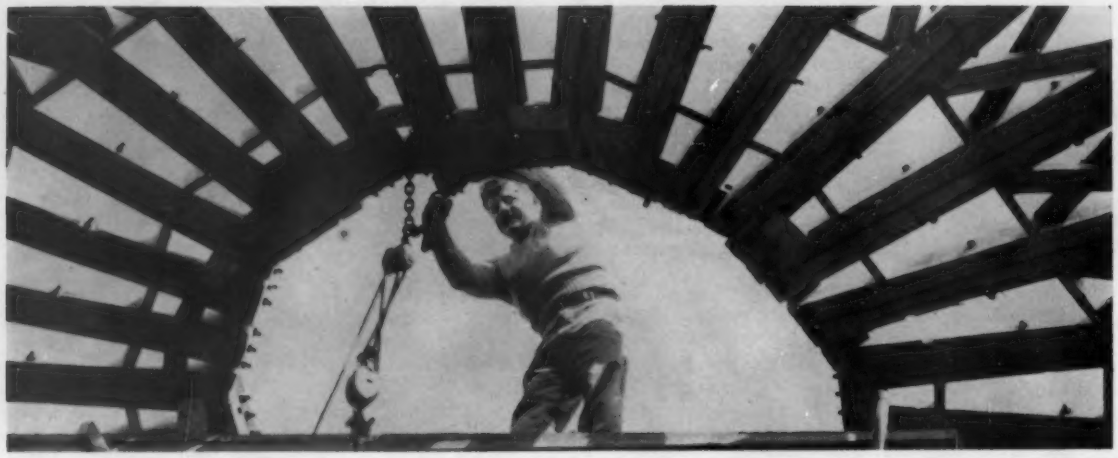


Fig. 1. Ventilator opening at center peak of building frames worker on scaffold as he secures block and tackle

Specializing in General . . .
Plant Engineering Designs, Fabricates and Erects

By RICHARD I. BLACK, Plant Engineer, W. L. Maxson Corporation, New York, N. Y.

UNUSUAL IN THE current age of specialization is an instance of generalization, and the Plant Engineering department of the W. L. Maxson Corporation has provided an outstanding example of the ability to do most anything.

Responsible for a total plant area of 180,000 sq ft, and providing services for 1100 employees, the New York plant engineering department consists of 44 "generalists" who, among other functions, provide for: Installation and maintenance of equipment—from pencil sharpeners to auxiliary power stations, from machine tools to microwave antennae; woodworking, from furniture repairing to model making; operation of trucks, elevators, heating plants, and test equipment; building maintenance — including portering, patching, painting and plumbing; plant relocation in sections and in total within existing buildings and in new buildings; construction work including cabinet making, special machine assembly and building renovation and erection.

An illustration of the successful operation of this policy of generalization is found in the recent completion of a building on our grounds. From drawing board to occupancy, Maxson personnel were entirely responsible for the erection of an internally-unobstructed building, 33 ft high and 60 ft across. No outside consultants or laborers were employed.

Fig. 2. Paved storage area adjacent to plant was site of special-design building

Basic requirements set for the building were: 1) an unobstructed hemispherically-shaped working area; 2) relatively short life and low cost; 3) ease of dismantling, transport and re-erection.

Design investigation favored a 12-sided, three-level structure made of prefrabricated wood frames, bolted together and covered with sheet metal, plywood and asphalt roofing. Windows were to augment interior floodlighting, and heating would be provided with gas-fired space heaters. Two 12 ft by 14 ft doors would provide access to the building, and the existing macadam area would become the interior floor, after minor modifications for drainage and leveling.

Several factors were conducive to the use of Maxson personnel to construct the building. Difficulty in obtaining a contractor to construct the unusually-shaped building; military security problems, urgency of completion, ease of financing, and personnel availability all contributed to the decision to construct the building with plant engineering personnel.

An interesting feature of the build-

ing's design is that once the framework sections are in place, the entire structure is self-supporting, without columns or buttresses. Wood-and-metal hoops are used at each level to give rigidity to the structure.

While foundation work was getting underway at the plant in Hempstead, L. I., the plant engineering woodworking shop was constructing the framework sections. Jigs and fixtures were devised to assist in duplicating the three styles of sections that were to make up the building. One hundred and two sections, 16 and 18 ft in length, were necessary to erect the building.

Immediately after the foundation was finished, erection of the first level of the structure was begun. This phase of the construction was accomplished with a movable pipe scaffolding and a "cherry picker" crane.

Erection of the two upper levels was done with scaffolding only. The prefabricated sections were held in position with temporary bracing until the entire ring of sections was closed to become self-supporting.

The covering of the framework was begun at the first level while the second level of the open structure was being placed. Corrugated galvanized sheeting was secured to the framework and the window frames were inserted in place. When the second level was erected, it was covered with plywood sheathing, as was the third level. Asphalt roofing paper, sealed with liquid asphalt, was used to cover the sheathing on second and third levels.

Utilities Installed

During the covering operations, plant engineering personnel were installing the lighting fixtures, utility outlets and other services. After the building was completely covered, the entire crew was turned loose on the finishing operations such as installation of windows and doors, weather stripping and caulking, building drainage ramps, installing ventilators and other associated jobs.

In addition to the special circumstances that made it almost mandatory that Maxson personnel erect the building, analysis of the complete job showed that our actual construction time of 11 weeks, nine days of which were rainy, was only four weeks over the best outside bid received, which was based on suitable working days. Costwise, our total expense was $19,500, which can be very favorably compared to the bid of $23,000 received from the outside contractor.

Versatility, availability and flexibility of our plant engineering work force were key factors in the successful completion of this building—the "all-around" man is still valuable.

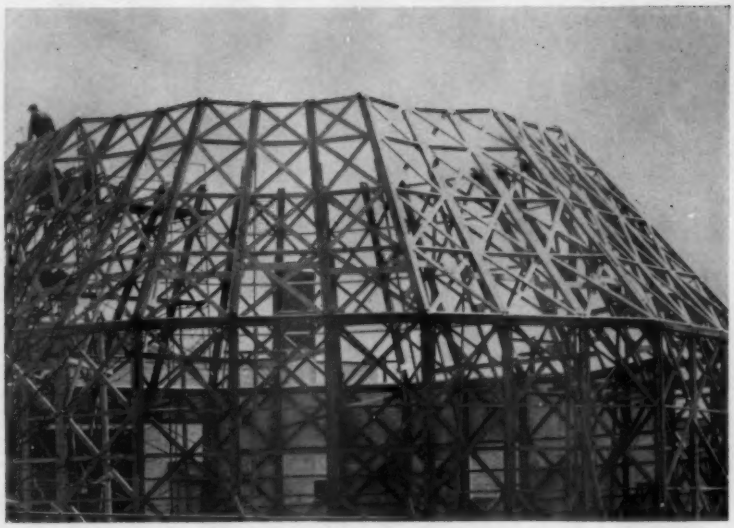


Fig. 3. Building skeleton rises as first two levels of construction are installed

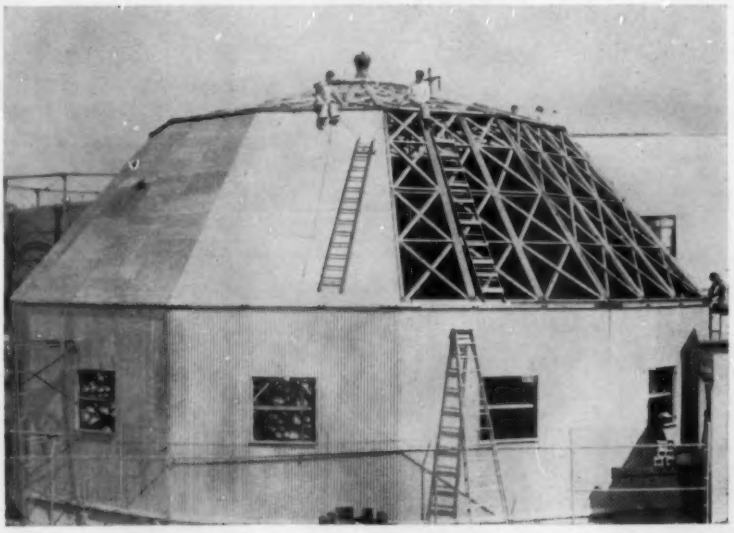


Fig. 4. With framework completed and siding on first level, plywood goes on roof

Fig. 5. Final result of Plant Engineering efforts—the finished 12-sided building

Fig. 1. Flexible metal hoses with pick-up nozzles convey feed ingredients to the stationary lines of the conveyor system

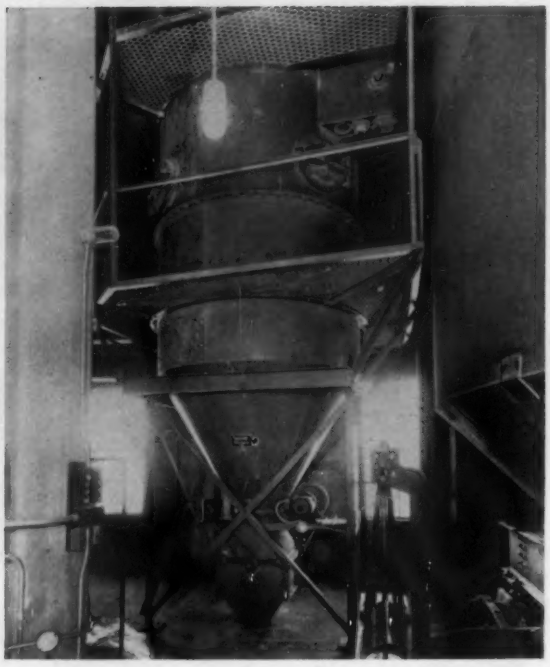


Fig. 2. The hoses pictured in Fig. 1 lead to rigid pipe line which, in turn, leads to this receiving filter then to exhauster

Lower Cost Plus Low Product Loss for

By L. G. WELLER, Manager, Airveyor Division, Fuller Company

INCOMING ANIMAL FEED ingredients are received in bulk and pneumatically conveyed from freight cars to storage at the Ralston Purina Company, Kansas City, Missouri. Advantages gained by the use of pneumatic handling system are: (1) cost savings, (2) a minimum of shrinkage, and (3) favorable labor relations through dust control and reduced manual labor.

Cost Savings

Most important cost savings are in "bulking" ingredients formerly handled in bags. This results in the virtual elimination of bag costs and the elimination of labor in handling and re-handling operations. It is estimated that bag savings are about $1.00-$2.50 per ton and that labor handling savings are about 75 cents a ton. Shrinkage is very low because there are no broken bags to contend with and because dust is not blown away but is pneumatically collected.

In operation, cars are left on the plant siding and are pulled by winch and cable to the unloading station, Fig. 1. At this station, two pneumatic hoses equipped with pick-up nozzles are moved into the car. These hoses connect with a rigid pipe-line leading to a receiving filter, Fig. 2, and exhauster, Fig. 3.

The filter separates the solids from the airstream and delivers them through an airlock to a distribution system for delivery to various storage silos. The airstream continues to the exhauster and is discharged to the atmosphere.

Ingredients handled by the system include bran, midds, meat scrap, corn germ, distillers grains, cottonseed meal, soybean meal, etc. The overall average rate of unloading is 20 tons per hour. The actual rate depends upon the physical characteristics of the ingredient.

Materials with poor flow characteristics (bran, for example) have low unloading rates. Materials with good flow characteristics (cottonseed or soybean meal, for example) have high unloading rates, provided the moisture content is low. The average rate of unloading for most other ingredients falls between these two. Unloading time varies from 1½ to 3 hr per car at Ralston's Kansas City plant. Although only soft feeds are handled pneumatically at this plant, the conveyor system also handles whole grains, unloading rates being between 1200 and 2000 bu per hour.

In unloading a car, one or two men may be employed depending upon the speed at which it is desired to operate and upon the difficulty encountered in handling a particular commodity. Ralston generally uses two men, principally because the volume of incoming material requires cars to be unloaded as quickly as possible.

Two Men Do Job

The men spot the car in position, open it, and move the nozzles inside as unloading progresses. Entering the car requires about 10 per cent to 20 per cent of the total unloading time. With pneumatic unloading, the men merely position the nozzles and at times "break down" the more difficult ingredients for easier nozzle pick-up.

The flexible unloading hoses connect to rigid lines which convey ingredients directly to the receiving filter. The first section of the rigid line

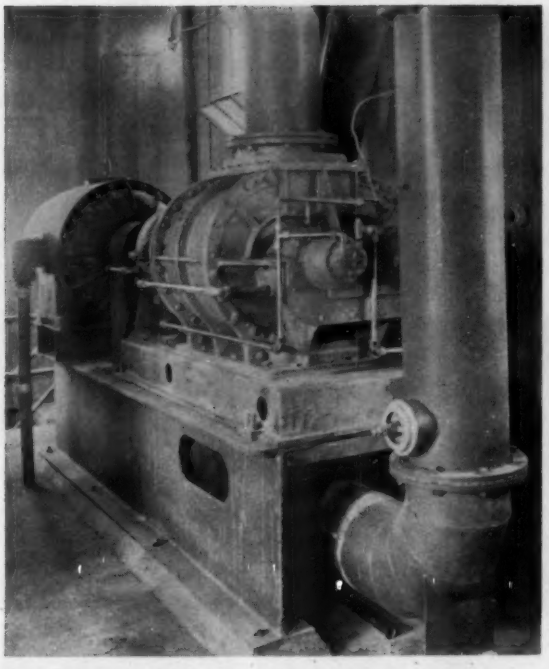


Fig. 3. This Roots type exhauster creates the powerful flow of air necessary to move materials through handling system

Fig. 4. Bagged ingredients—about 2 per cent of total—are emptied into hopper for pneumatic handling from there on

Ralston With Its Pneumatic Handling

is of a telescopic construction. This enables the hose to pull out as the men reach into the car. It avoids work stoppage for adding sections of hose and increases efficiency by about 20 per cent. The men merely advance the hose as they go, the telescoping section extending as unloading progresses. A switch conveniently located near the car door operates a motor which advances and retracts the telescopic section as required.

To expedite the handling of a small amount of bagged ingredients received at Kansas City, Ralston has installed a special hopper beneath the receiving platform. This hopper rolls out, Fig. 4, at car door locations and bags are opened at the car and emptied into the hopper. The pneumatic lines are lowered into the hopper and pick up the contents and deliver them to the filter as in the case of bulk material. Thus, once a bag is emptied, no further manual handling is required.

At the receiving filter, incoming material is separated from the airstream. The filter comprises a cyclonic separator and a cloth filter as one integral unit. By combining cyclone and tubes in one housing, floor space is conserved. The filter retains 100 per cent of the visible dust in the exhaust air.

Air is drawn tangentially into the cylindrical section of the filter and as it swirls around the inside circumference, solids fall by gravity into the conical section of the filter and are discharged through a rotary airlock. (The solids, because of their inertia, cannot make the rapid changes in direction required by the circular travel of the airstream, and consequently fall from the stream.) The air travels a spiral path, the outlet being upward through a central pipe extending part-way into the cone.

As it exits, air passes through the filter tubes which collect any dust which may be in the stream. Filter tubes are located in four separated compartments. The flow of air through each compartment is periodically reversed and the tubes mechanically shaken to release entrapped solids. This cleaning operation takes place automatically, compartments being cleaned one at a time, in sequence.

Motor-Driven Airlock

The airlock operates on the "revolving door" principle. However, it is positioned with its axis in the horizontal rather than the vertical position. One group of pockets collects solids from the cone of the cyclone while the opposite group is discharging. The airlock is motor driven. Bearings are of the anti-friction type. The rotor is of heavy cast iron construction, and is adjustable for wear.

The exhauster, Fig. 3, used to create the flow of air which propels incoming ingredients, is of the Roots, positive displacement type.

$41,000 Savings—

That's What Insulating Oil Filtration Did For Kelsey-Hayes

By R. E. HEISEY, Chief Electrical Engineer, Kelsey-Hayes Wheel Co., Detroit

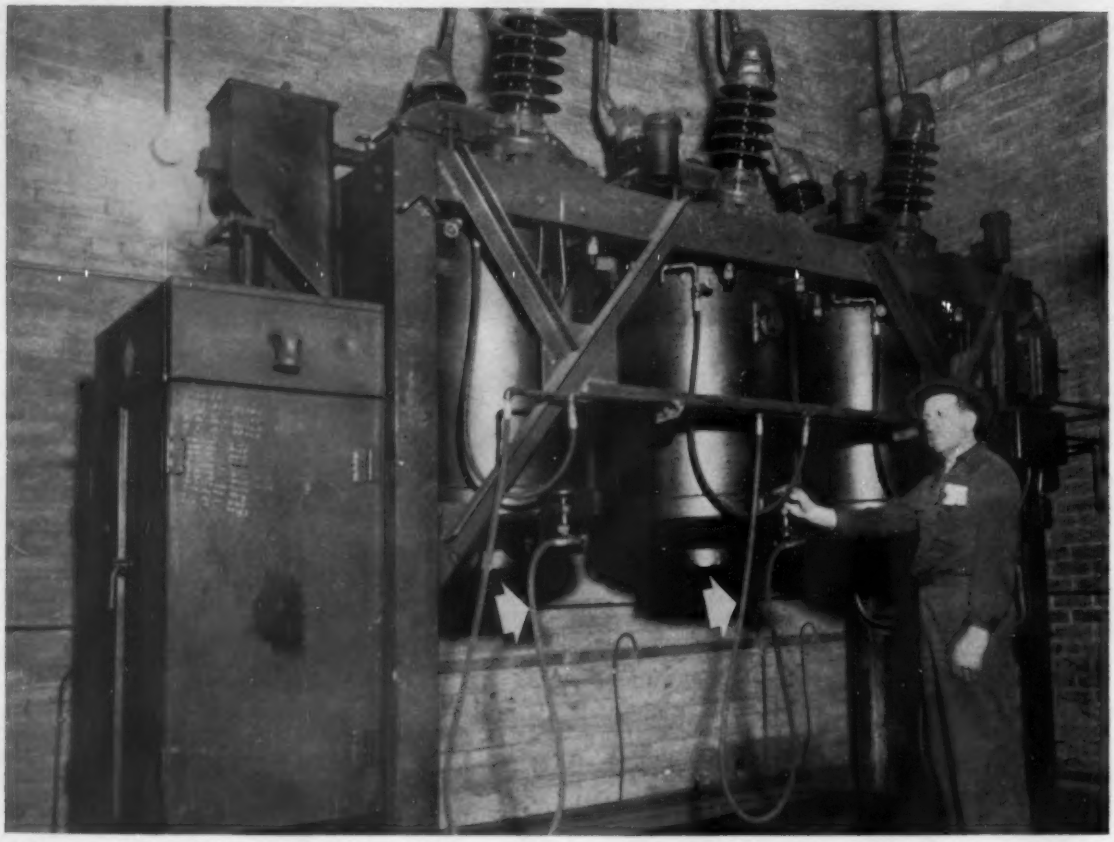


Fig. 1. Oil in this breaker is filtered continuously. Hoses (arrows) are time-savers in lowering tanks for inspection

IMMEDIATELY after World War II, we installed in our plant a 2500 kva, 24 kv furnace transformer, Fig. 3. Ahead of this, a multi-tank breaker (each pole in a separate tank) rated at 24 kv and 600 amp was installed, Fig. 1. This breaker is in the electric furnace circuit and operates on an average of 100 times per day.

The arc drawn on each circuit break soon carbonized the oil and reduced the dielectric strength to such a low value that we had to shut down approximately every three weeks to change the oil. The change required the services of eight men since we had to drop the three tanks, rinse them with clean oil, wipe off contacts, lifting rods, and so on. This procedure became very expensive and we decided that something had to be done to reduce the cost of labor and material. The only obvious solution was oil filtration, but this had its problems since the methods known were not practical.

For many years, the power transformers in the plant were filtered once a year by an outside oil filtration company which brought its own equipment to the job. However, to filter the breaker oil twice a month using the outside service would not have reduced the cost enough to make it practical, so that method was abandoned.

The next approach was to purchase a filter that could be used continuously. This plan narrowed the field down to a disc type filter which up to that time had never been applied to this kind of high-voltage breaker. The centrifuge type filter was ruled out since it required an attendant and the initial cost was high. The press type filter was also considered but this too required an attendant. The filter which we elected to purchase required no attention and had a low original cost. The discs in the unit are constructed of specially treated paper. They are stacked surface-to-surface with no separators between them. A spring under tension runs through the center of the discs and keeps them compact.

The unit selected contains 31 filter

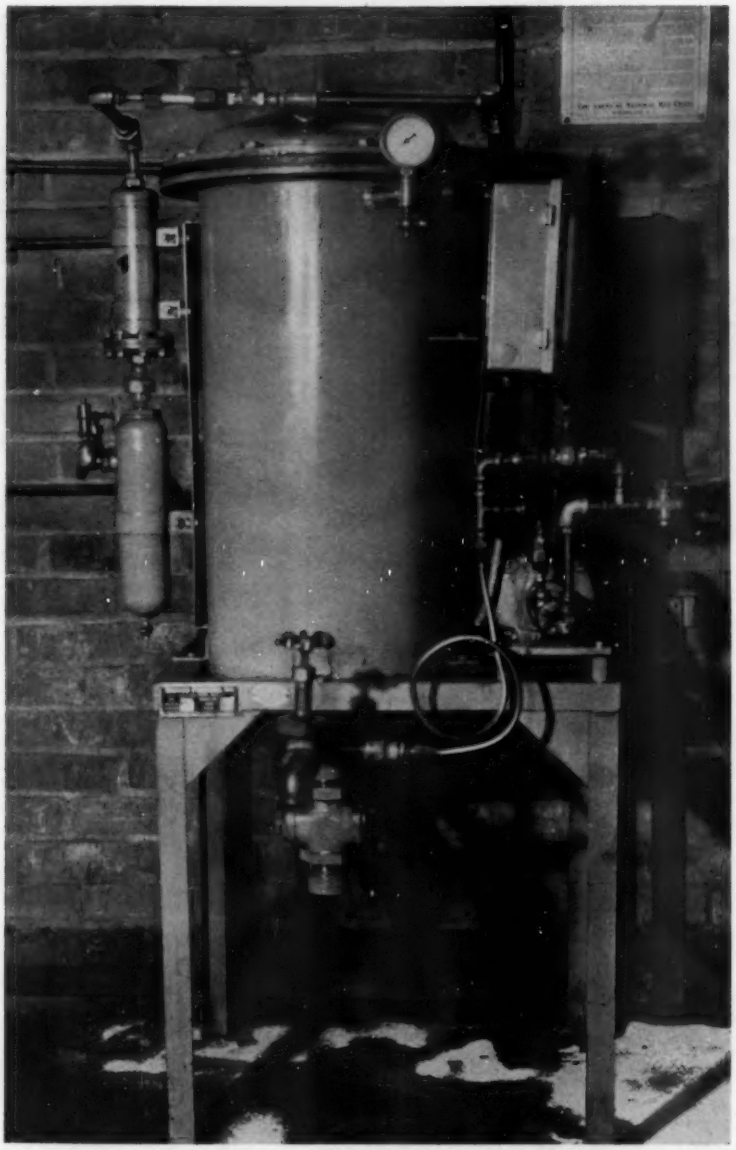


Fig. 2. Filtering unit having 31 elements is located in the circuit-breaker vault

elements in a common steel housing, Fig. 2. Each of the filter elements is 24 in. long and will remove solid impurities, as small as 5 mu, including sludge, gum and moisture. The cleanable elements are long-lived and will not channel. They provide positive control of the filter oil and do not permit accumulated impurities to migrate into the filtered oil stream.

We have had this filter in operation for eight years and have never changed the oil in the breaker. A maintenance schedule was set up to draw samples for dielectric tests every three months. These are sent to the power company's testing laboratory. It might be well to point out that care in sampling and testing cannot be over-emphasized. The results so far in eight years show that the oil has never dropped below 28 kv and 90 per cent of the tests indicate a dielectric test of 30 kv.

In some areas of the country, great emphasis is placed on the acidity of the oil. Organic acids caused by oxidation of the oil are normally not dangerous, but if the process is continued long enough, they may become so strong as to damage the insulation. We had the oil which was in use in this breaker for eight years tested recently for acidity by the power company and the results were surprising. The report showed that this eight year old oil had a neutralization number of 0.06 and stated that new oil tests at 0.05.

This filter has paid for itself many times, since we have reduced labor costs about 80 per cent and reduced the cost of oil replacement almost 100 per cent. Converting the above percentages to actual figures will give us some indication of the dollar savings per year since installation of the filter.

As stated previously, before the installation of the oil filter, we used eight men once each month on the maintenance of this breaker. These men were paid an average of $3.00 per hour for overtime and put in a minimum total of 64 hr per month. This resulted in a yearly labor cost of $2304.00. The annual cost of new oil replacement using 500 gal per month at $0.55 per gal was $3300.00. The total maintenance cost per year therefore was the sum of these two or $5604.00. Now let us compare this figure with the cost of maintenance after the installation of the filter.

We now use only two men who are paid an average of $3.45 per hour and who put in a maximum of 12 hr per month, for a labor cost of only $496.80 per year. Little or no oil is added with the exception of three pints that are drawn as samples every three months or 1½ gal per year at a cost less than $0.83.

Of course, the cost of operating the fractional horsepower motor should be considered. This amounts to about $39.50 annually. In addition to this, we have the filter pack replaced every two years for an annual cost of $47.85. The total maintenance cost per year after filter unit installation is $584.98.

The savings resulting from the installation is the difference between the annual costs before and after the filter installation or $5019.02. The sum of $190.00 can be added to this inasmuch as we also use the filter unit to clean the oil in our 2500 kva transformer which is located near the breaker. Formerly, approximately 1900 gal of oil in this unit were filtered annually by an outside company at the rate of $0.10 per gal. Over a period of eight years, the savings are $41,672.16.

Looking at the savings in another way, we note that 768 hr of labor were charged to the maintenance of the breaker before the filter installation. After the unit was in, this dropped to 144 hr, for a yearly savings of 624 hr. In eight years, this amounts to 4992 hr of labor saved. On a time and a half basis this amounts to 7488 hr of labor that was not necessary.

The quantity of oil used has been reduced from 6000 gal per year to 1½ gal per year, for a savings per year of 5998.5 gal. This would amount to 47,988 gal in a period of eight years.

It might be well to consider a num-

ber of details relating to insulating oils used with electrical equipment. For example, lack of attention to transformer and breaker equipment in plant service may have serious consequences. Careful and frequent inspection according to the manufacturer's directions are essential. In spite of all precautions, moisture may be absorbed by the transformer if it is of the open type. During the first few days of operation, it is well to inspect the inside of the manhole cover for moisture. If sufficient moisture has condensed to drip from the cover, the oil should be filtered.

Dielectric Tests

Few industrial companies are equipped to test the dielectric strength of oil in transformers and breakers. However, all utility companies have this equipment and will cooperate with you in running such tests if you will draw off and deliver test samples to them.

The sample for dielectric tests should be taken from the oil valve at the bottom of the tank. Sample jars should be cleaned with gasoline and thoroughly dried. Do not use any rubber seals on the covers of the samples. It is preferable to place aluminum foil between the screw cap and the bottle opening.

Oil filtering companies will, for a nominal cost, bring their test equipment to your plant and perform this service for you. A report on voltage breakdown of each piece of equipment is included, Fig. 4. Dielectric strength tests should be made according to ASTM procedure using flat disc electrodes, 1 in. in diameter and spaced 0.100 in. apart.

One important factor which determines the life and satisfactory operation of a transformer or circuit breaker is the condition of the oil in which the electrical system is immersed.

Some of the characteristics necessary or desirable in insulating oils are: 1. High dielectric strength; 2. Freedom from acids, alkalies, and sulphur compounds to prevent corrosion of the copper and injury to the insulation; 3. Low viscosity, to permit rapid circulation of the oil; 4. Low freezing point, to keep the oil liquid in cold weather; 5. High resistance to emulsification with water; 6. Freedom from formation of sludge under normal operating conditions.

Good insulating oil, when free from moisture, should not break down in the standard test cup at less than 22,000 v. It may run as high as 30,000 v before breaking down. Oil that tests at 20,000 v or less is classified as undesirable and should be filtered. New oils should test at no less than 22,000 v.

Fig. 3. Oil used in this 2500 kva transformer is filtered by unit on week-ends

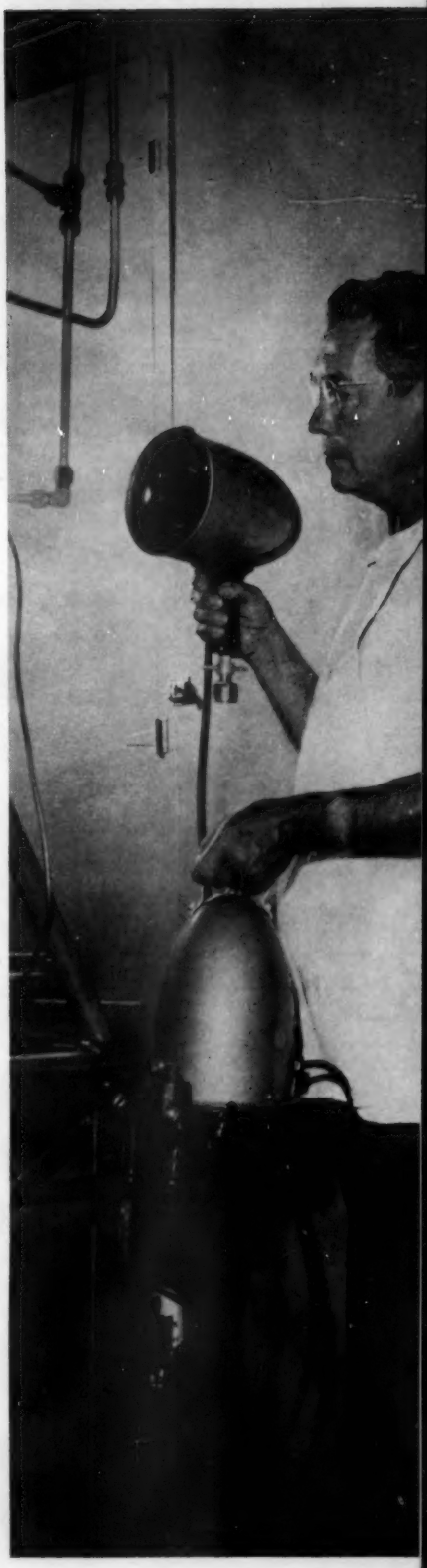
W. A. SAUNDERS COMPANY

The following data indicate the results obtained in tests on your insulating oils before and after dehydration and purification.

Order #W. P. 9210 Att. - Mr. R. E. Heisey — Date 6/4/53

Mfrs. Serial No.	Owners Prop. No.	Location	Make	K. V. A.	Cap. Gals.	K. V. before	K. V. after
2047718	51620	South Bank Foundry	Allis Chalmers	500	190	21	30
2047720	51622	" " "	" "	500	190	20	30
2047719	51621	" " "	" "	500	190	22	30
1948614	40277	" " "	" "	500	190	20	30
1948615	40278	" " "	" "	500	190	23	30
1948613	40279	" " "	" "	500	190	17	30
1809099	- - -	Furnace Trans.	" "	2500	1939	22	30
1556087	- - -	North Bank	" "	300	236	22	30
- - -	- - -	" "	Wagner	500	236	21	30
240975	- - -	" "	"	500	236	21	30
240974	- - -	" "	"	500	236	23	30
		75 Ga. Oil added					

Fig. 4. Report by filtering firm shows effects of oil filtration on kv breakdown



Process, pressure and utility lines may be inspected for leaks with an ultraviolet light

Black Light—

Plant Men Turn Detectives With This Handy Maintenance and Inspection Tool

ADD STILL ANOTHER tool to the plant maintenance kit: an ultraviolet lamp. Almost imperceptibly, the plaything of the "rock hound" and the deadly serious partner of the titanium and uranium prospector is finding its way into one plant after another.

Here are but a few practical examples:

One: A midwestern miller's storage bins were being pilfered by rodents. The company's maintenance staffers ran visual checks but couldn't discover how rodents were entering. Doors were tightly sealed, apparently ratproof. Bin linings revealed no holes or ruptures. Then someone thought of ultraviolet light—more precisely: that animal excretion, particularly urine, is fluorescent.

Using black light, maintainers easily found the rodents' path. It led to a seemingly sound joint. Closer inspection revealed a rat-sized hole. Here, black light played detective: enabled inspectors to follow an invisible trail made fluorescent and thus visible under ultraviolet light.

Two: When a Lockheed Aircraft engineer wanted to "sell" his boss on a new materials flow layout, he first drew the department and its existing flow-pattern in india ink. Over this, he sketched his proposed departmental change in invisible, fluorescent inks. His streamlined layout "sold" management."

First, he'd explained the faults of the existing flow pattern—illustrating his contention with the black-ink schematic.

"Now," he said, "here's the way I think it should be"—and he switched on an ultraviolet lamp. There, superimposed over the ink drawing were the fluorescent lines of his proposed change. Superimposing two patterns in visible inks would have been confusing—and far less convincing. Ultraviolet presentation helped him "sell" top management. Result: Lockheed earmarked thousands of dollars for a departmental realignment.

Three: At a Los Angeles food processing plant, engineers now accept no storage vessel or tank without first filling it with water to which a water-soluble fluorescent material has been added. The tank is allowed to stand several hours. Then it is visually inspected for leaks. And finally, every joint and welded seam is scrutinized under the bluish rays of an ultraviolet lamp. If there's a leak, regardless of size, it will fluoresce brilliantly—thanks to the fluorescent additive.

Four: Trouble-shooting runs of exposed sewage lines is easy with black light. Most soaps and many detergents contain additives which in themselves are fluorescent under black light. Two assumptions can be made: First, if fluorescence is detected in a plant's fresh water supply, contamination by sewage is indicated. Second, sewage piping can be "trouble-shot," by inspecting all joints under black light. One more positive method is to add one of several fluorescent tracing soluables (Uranine dye, for example) to the flushing or drainage system and check suspected areas for greenish yellow fluorescence.

Detecting Greases

Five: Recently plant maintenance men were asked to check the efficiency of a cafeteria dishwasher. Dishes weren't coming out clean. Yet even after the dishwashers' distributor had tinkered with the machine and pronounced it cured, the cafeteria manager wasn't satisfied.

The problem was complicated because it's difficult, visually, to detect contamination—especially greases—on white china. Yet the plant's own maintenance staffers, falling back on black light, easily solved the problem. They simply added a few teaspoons of the water-soluble fluorescing powder to the dishwasher's reservoir. Then, as plates exited from the machine, they inspected them under black light. The evidence was convicting: dishes were specked with a greyish film. It was

Fuel cells, already coated with liquid nylon, are given another coat containing fluorescent dye. Under the black light, incomplete coverage is apparent

determined—comparing this to the fluorescent color of the machine's deterent—that the specks were fats, not removed by the machine. The dishwasher's distributor was called in—and he reworked the machine without charge.

Six: In a food processing plant, black light is used almost weekly to convince janitors that they're not properly cleaning lavatory washbasins. Grease films fluoresce under ultraviolet light. So does human urine (which fluoresces bluish or yellowish white). Black light, shone over towels, reveals whether they've been used or not. (Grease and sweaty handprints are vividly fluorescent).

Seven: Black light's more conventional plant use—as a detective, is coming in for greater play. First, pilferage is on the increase. In one Vernon, Calif. plant (which manufactures a home appliance), detectives recently discovered that 500 of the plant's 1500 employees were stealing appliance parts! Some of the detective work involved opening lunch pails and thermos bottles (one employee had removed the thermos' glass lining, was using it to cart home parts).

Eventually he—like many others—equipped their homes with his company's appliance. But part of the sleuthing involved black light. After work hours, detectives coded an entire day's production with an invisible fluorescent blue paint. A month later, detectives visited the suspects' home. When they examined the appliance under black light, the part—obviously snatched from the production line—fluoresced brilliantly. The evidence, again, was convicting.

Eight: Another maintenance department inspects all piping runs—particularly pressured lube lines—with black light. Added to lube reservoir is a very small amount of oil-soluble fluorescent powder. Under black light it fluoresces bright yellow. It's easy to trace leaks. Fact is, leaks from various lubrication reservoirs can be tagged and individually trouble-shot using different colored fluorescing dyes for each source.

Black-light is a logical and useful tool for plant maintenance. There's nothing mysterious about ultraviolet luminescence. Simply stated, black light, a long-known phenomenon, is an ultraviolet emitting source filtered to eliminate most of the visible light. Under the light's beam, many substances fluoresce — become variously hued. The fluorescing color and its intensity while partly dependent upon the light source (and its intensity), nonetheless demonstrate certain characteristic colors. And so, in effect, the plant engineer is gifted, under ultraviolet light, with a secondary pair of eyes.

Consider for a moment the detection of rodents thru black light. Ordinarily, rodent excretion (particularly urine) cannot easily be seen by the naked eye. Yet not only rodent urine, but also rodent hairs, become fluorescent under black light. This is an inherent property.

How did the milling company's maintainers trouble-shoot their rat problem? They inspected the suspected area with black light, holding the light from 3 in. to 6 in. from the floor. Dried rodent urine fluoresces bluish white to yellowish white. Fresh stains fluoresce more bluish than older ones. Rodents invariably urinate while in motion. Their path is a characteristic droplet pattern. To trained eyes—and it doesn't take much training—the fluorescent pattern is unmistakable. This helps eliminate confusion with other fluorescent materials.

Rodent hairs show a bluish-white fluorescence under black light and can be easily identified on sacking or intermixed with grain. Rodent feces, on the other hand, does not normally fluoresce.

No trouble-shooting instrument is perfect. For best results, black light should be used by trained personnel. This, because a number of materials respond to black light and may appear, at first glance, the same color.

Thus not only rodent urine, but also some greases fluoresce with an almost identical blue-white. Examples: sulfide wastes appear bluish white; lubricating oils tend to be greenish or bluish white; bleached fibers in sacking are often bluish white. Pitches and tars fluoresce yellow. Optical bleaches found in most plant-used detergents and soaps will make white cloth fluoresce a brilliant bluish white.

A little practice, and plant maintainers can catalog scores of troubles by their predominating fluoresce. Several black light units are marketed commercially, some costing as little as $16. Thus black light becomes a readily available, practical tool.

Process tanks in food and beverage plants are a ripe source for dirt contamination. Grease and other materials can be identified by color of fluorescence

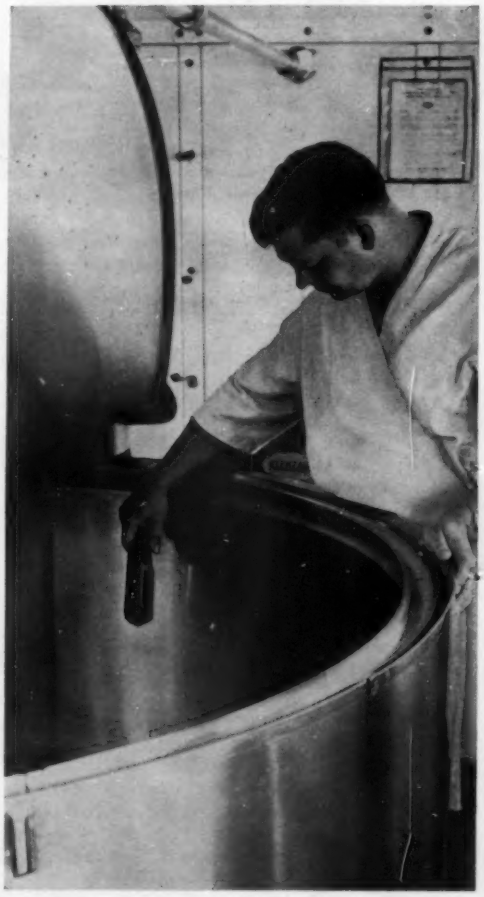


Fig. 1. These transfer connections were specifically designed for the Norton Company installation to allow for a possible misalignment of as much as ¾ in. These special transfer connections are now standard items in the manufacturer's line

Insulated Bus Bars—

How They Eliminate Low Ceiling Safety Hazard at Norton

ONE SAFETY HAZARD which had plagued Norton Company for many years was the exposed bus bars providing power to a travelling weighing hopper used for weighing abrasive grain. Since the hopper travelled through several parallel bays at various cross-over points, many proposed solutions were not feasible.

Final answer to the problem was the installation of insulated bus bars with specially designed connections at the cross-over points.

The operator is now completely shielded from the 220-volt power line by the covered bus bars which makes it practically impossible for anyone to come in contact with the power accidentally. The contact is made by the sliding shoes travelling in a recessed stationary track which conceals the bus bar except for a slot through which the shoe passes. After several months of operation, there has been no maintenance problem. One of the unusual features of this installation is that the conductors are designed to function properly even under conditions of misalignment up to ¾ in.

The bus bars are made by the Insul-8-Corporation in Burlingame, California and were purchased through Robert Abel & Co., Inc. of Boston who engineered the job and designed the special cross-over connections.

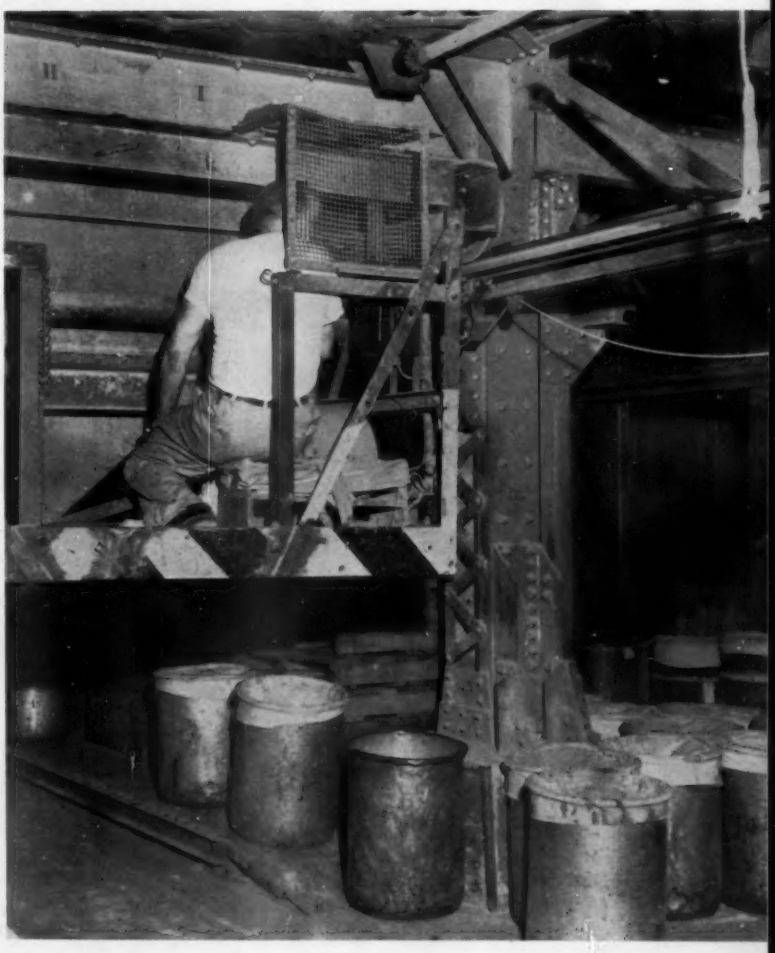


Fig. 2. Because of the low ceiling the bus bars, right, for this travelling weighing hopper were dangerously close to the floor. The new bus bars provided a maintenance-free solution to hazard

Package Boiler Maintenance Pays Off—

Auburn Spark Plug's Planning Brings Low Overall Costs

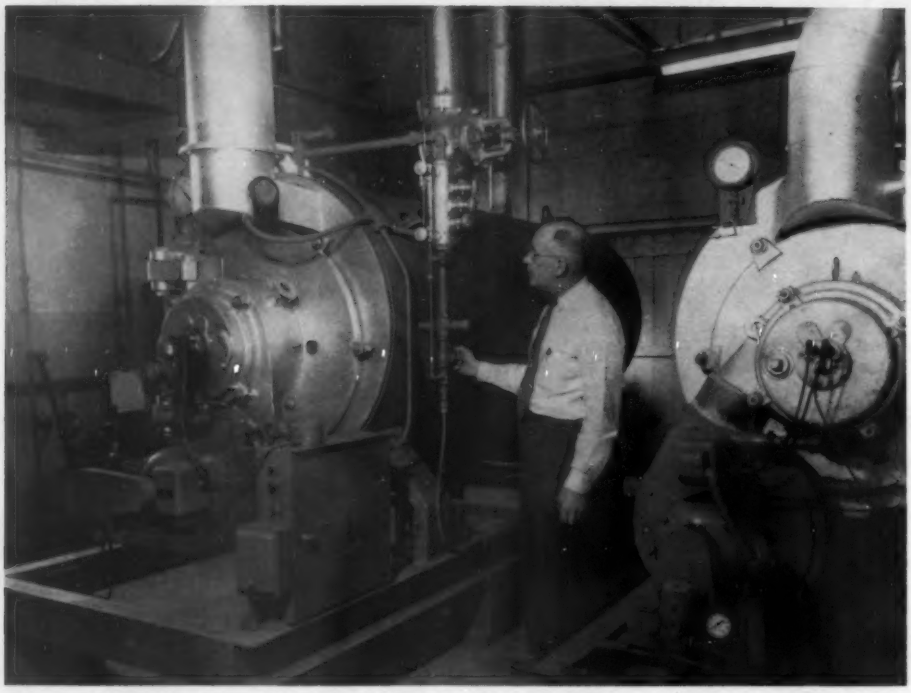


Fig. 1. These two boilers at Auburn Spark Plug plant—the 60 hp unit is at the left—require less than $100.00 worth of maintenance per year. Other recorded costs are comparatively low

THOUGH PACKAGE steam generators continue to be installed in ever-increasing numbers, there are still many engineers who feel that these units will just not stand up through years of continual use. That this is not true is shown by an installation at the Auburn Spark Plug Company plant in Auburn, N. Y.

At Auburn two package steam generators have supplied steam for processing and heating throughout the past seven years at an efficiency of 80 per cent or better. Yet Auburn engineers figure that they spend less than $100 a year on boiler maintenance. And, of course, the twin installation is less expensive to run than the single unit it replaced.

Just after the war, Auburn Spark Plugs, a leading manufacturer of liquid level control electrodes and oil burner igniters, decided to replace their stoker-fired hrt boiler with a more modern steam plant. To do the job, the company selected two Cyclotherm steam generators: one 40 hp boiler and one 60 hp boiler. Both of these boilers cut in on the same line, and both are used for heating and processing.

Two different size boilers were selected for this reason: The 40 hp boiler can handle the plant's entire processing load. Therefore, in the summer time, Auburn finds it convenient and economical to run only the 40 hp boiler since there is no heating load to carry. This boiler is the main unit for about four months a year, while the 60 hp unit is the standby boiler.

During the winter months, the 60 hp unit becomes the primary boiler; the

DATE	TEMP			DEGREE — DAYS FOR				GALS FUEL USED FOR				60 HP		40 HP	
	MAX	MIN	AV	DAY	WK	MO	SEASON	DAY	WK	MO	SEASON	TEMP	CO_2	TEMP	CO_2
					16		4269				25518				
1	60	32	46	19	35	19	4288	161	161	161	25680	430	10.5	510	12.5
2	44	31	37	28	63	47	4316	222	384	384	25903	430	10.5	520	12.0
3	39	22	31	34	97	81	4350	205	589	589	26108	430	10.0	520	12.5
4	22	12	17	48	145	129	4398	319	909	909	26428	440	10.0	530	12.5
5	28	16	22	43	188	172	4441	292	1201	1201	26720	440	10.0	500	12.0
6	29	20	24	41	229	213	4482	107	1308	1308	26827	440	10.5	510	12.5
7	39	25	32	33	33	246	4515								
8	37	28	33	32	65	278	4547	313	313	1621	27140	440	11.0	520	12.0
9	42	26	34	31	96	309	4578	218	531	1834	27358	440	10.5	520	12.5
10	37	25	31	34	130	343	4612	216	747	2055	27574	450	10.5	510	12.5

Fig. 2. Portion of the monthly chart maintained to check the day-to-day performance of steam generators. Chart covers operation for first ten days of Mar., 1954

40 becomes the standby. The 60 hp unit supplies sufficient steam for both heating and processing during the average winter day. Therefore, it becomes the primary unit for about eight months a year. It is only during the most bitter winter days that Auburn finds it necessary to utilize both boilers.

Auburn engineers feel that it is much more important to maintain comfortable working temperatures during the winter months than to conserve fuel oil. However, when the new boilers were installed just after the war, the plant ran into a fuel oil shortage. At that time, the plant engineer initiated a fuel conservation plan.

Record-Keeping Helped

They made careful notes on outside temperatures throughout each day. Each morning the boilers were fired at exactly the right time to raise interior temperatures to 70 F by the time workers punched in for their day's work. The boilers were shut down before the working day ended.

Auburn was half way through its first winter before the fuel shortage threatened them. During the heating season of 1947-1948 Auburn burned 31,000 gal of fuel oil. The following winter, 1948-1949, with the conservation plan in effect all through the heating season, the boilers used only 23,000 gal of fuel oil.

Since the days of the oil shortages, Auburn's plant work has expanded to extra shifts and the pressure for extreme economy in fuel consumption has abated. Therefore, the fuel consumption figures have climbed back into the lower 30,000's.

Fuel Use Below Estimate

When the boilers were first installed Auburn had estimated that they would consume 55,000 gal of fuel per year. But actual consumption has averaged 30,000 gal annually. When figured without the overtime shifts, not included in the original estimates, fuel consumption now runs about 25,000 gal a year. This is less than half the provision initially set aside for annual fuel costs.

Though the necessity to keep extremely close tabs on oil consumption has slacked off, the plant engineer still feels that it is a good idea to keep a monthly chart on boiler performance. This chart includes the following factors that affect boiler performance: Daily maximum, minimum and average temperatures; daily degree days, plus an accumulating total of degree days for the week, month and season; fuel consumption, plus a cumulative

(Continued on page 204)

New Equipment, Methods Cut Building Cleaning Schedule

NEW EQUIPMENT and ingenious methods recently helped clean a 19-story building in Rochester, N. Y., in record time recently. The building of cream colored brick and terra cotta, with limestone pillars, houses the general offices of Eastman Kodak Company.

Over the years dampness had tended to hold dirt and grime on the surface of the stone and brick and this could be removed only by a steam process or by sandblasting, depending on the type of masonry to be cleaned. At Eastman it was necessary to use both—steam for the brick and stone, sandblasting for the terra cotta.

The buildings had been cleaned previously with methods that had been time-consuming and that had caused considerable inconvenience to personnel. For this new cleaning Kodak plant engineers consulted with the Genesee Building & Waterproofing Co., Inc., of Rochester.

This company made a careful estimate of the work that was to be done, basing its figures on the use of manual type machine winches for swinging the scaffolds, and using an older type steam machine, the only kind then owned by the company. Doing the work in this way, it was estimated that the job would take 90 days.

In his advance planning of the job, the contractor found himself confronted with two problems.

1—There would be a serious loss of time involved in moving and setting up the manual type machine winches for the scaffolds, which must be operated by 200 ft cables. This meant that all the scaffolds must be tied and anchored. This would allow for splicing sections of cable to these 200 ft lengths to facilitate reaching the top. Total height was approximately 300 ft.

2—The older type steam machines were not capable of pumping steam the 300 ft. Thus, the machines must operate from the 19th floor, making it necessary to go in and out of office windows to tie the steam hoses, a further loss in work production in addition to being an inconvenience to workers in the offices.

The contractor therefore purchased four new Kelite, Model R, steam vapor cleaners, capable of delivering steam at 150 psi continuously from the ground level to the top of the building.

In line with this the building company was also able to rent four sets of Albina Mechanical Stirrups from the Albina Engine & Machine Works, Inc., of Portland, Oregon. This equipment was fitted with 300-ft cables and automatic electrical controls that made it possible to lower or raise a scaffold with just a touch of a button.

Brick was first brushed by hand and then steam cleaned. This was done with a balanced, 51-in. Kelite

(Continued on page 210)

New hoist equipment and a new steam vapor cleaner cut 30 days off the time estimated for cleaning, sandblasting and tuckpointing Kodak building

Fig. 1. Tooling at Dalmo Victor begins in the design department which is supervised by Merrill Hugo, standing beside designer

Tool Storage With Fingertip Control

With good storage and good control Dalmo-Victor can now find its tools, and find them in good condition . . . Losses of tools loaned to vendors is now small thanks to this receipt system

CURRENTLY ENGAGED in short-run precision manufacture of airborne radar antennas, the Dalmo Victor Company, San Carlos, Calif., is reaping benefits from a tightly-integrated tooling program.

Dalmo's 31,000-sq ft Belmont Plant 4 turns out some 2,500 different components; about 60,000 units monthly. Yet production runs are usually under 300 units. Because of continuing radar research, component specs can change overnight. To meet new engineering and production demands, plant operation must be flexible, geared to quick changeover with minimum time and output loss. And at Dalmo, tooling is the key to production changeovers.

Main concern is cost of the jig, fixture, special tool or die, weighed against the time it will save. Savings must be drastic because each fixture produces relatively few parts.

To achieve minimum tool investment, designers strive for multiple use. Often several different operations are performed with a single fixture. A cross-filed index shows which tools have multi-uses.

Tools are numerically stamped in the order of their use. Removable parts of fixtures bear the same stamp as their parent.

No less important than design is tool storage. Here good housekeeping is the rule, backed by a smoothly-functioning check system of some 40,000 items. Gages, fixtures, boring tools and other equipment are neatly housed in varnished pine racks bearing tool numbers in contrasting white. Carbide-tipped cutting tools, reset and reground if necessary, are dipped in a rust-inhibiting plastic solution before nesting in racks. Equipment is lined up on steel Lyons shelving ten tiers high. Sections are lettered, shelves numbered. Thus, a requisitioned tool can be located in seconds by its index card at the counter.

Tools are requisitioned in triplicate on a serially-numbered "loan" blank. Machinist gets one copy; another replaces the "loaned" tool or is clipped to the shelf. A third goes in a McCaskey register—a large book of metal pages, fitted with rows of clips; one page is assigned to each department of the shop. When an item is returned all copies are destroyed. A bonus feature of the system: during inventory the register shows the location of any tool in the shop at a glance.

Cutting tools are color-coded. Red indicates a finishing tool; green, roughing, and red-and-green, dual-purpose; a multiple diameter tool, for example.

Each tool in storage is stamped to show (1) its purpose, (2) component number, (3) tool serial number and (4) tool sequence number. "T" is for tooling; "E" stands for gages. So a tool stamped "T-96-14879-19" shows (1) that it's used for tooling (2) on project No. 96, (3) that the serial number is 14879 and (4) that it's the 19th tool used to manufacture that component.

In the event of modifications, a letter is added to show that the tool matches the latest engineering drawing. Sometimes tooling can be reworked to fit new specs.

As far as possible, tools for any component are stored together. Where this isn't feasible, similar tools are kept in the same section.

An innovation is a tool reconditioning section, consisting of a complete grinding department, set up between the two points of tool issue: tool storage and the tool crib, where standard items are issued. The grinders were lifted out of production to permit closer control over reconditioning.

In close proximity is the tool and die shop, where new designs are built up the hard way, and tools for their manufacture are made right along with them.

An important concern of tooling at Dalmo is to put the burden of production on operators rather than on highly-skilled journeymen. A machinist working with proper tooling can turn out a piece in minutes that might take a journeyman hours, as a custom job.

The company used to have trouble with tools being returned by vendors in rusted or broken condition—sometimes not at all. Now the tool loss from vendors is negligible—thanks to a memorandum receipt system started in late 1953.

It works like this: memo sheets are made in triplicate, only one tool to a sheet. A photo of the tool is attached to the vendor's file copy. The vendor signs another copy, which is returned to Dalmo and filed with the original. Of course a responsible party must sign for the vendor.

The business end of the tooling organization is the control section. This unit controls timing and paperwork for tooling—supervision of storage, receiving orders, budgeting, accounting, timekeeping, material changes and allocation of funds for each job. Relieved of paperwork, tooling department heads can concentrate on their main task.

Fig. 2. Left. C. F. Lukrich, left, Plant 4 superintendent confers with Don Romaca, assistant supt., in the tool storage room

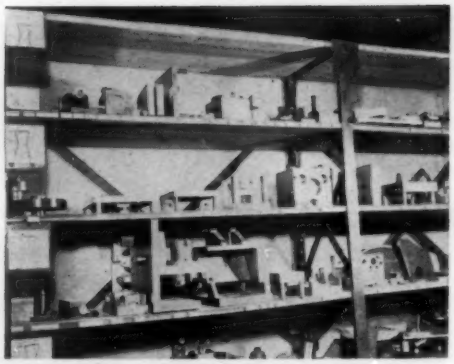


Fig. 3. Right. When a fixture in tool storage is removed from the shelf, a tool loan order is inserted under the clip, left

Fig. 4. Hank Green, left, tool control supervisor, signs loan order in triplicate for Cecil Gardner

Fig. 5. Record of all tools is kept in this register. Each department has its own file in the register

Fig. 6. All the plant's special gages are kept in velvet-lined polished mahogany cabinets with beautifully etched glass fronts and brass hardware

Fig. 7. Tool production is speeded on machines like this jig borer used here by tool maker Thomas Derickson. The onlooker is Foreman Ludwig Greis

Fig. 8. These grinders were taken out of production and set up as a tool reconditioning department for close control of all product tolerances

Fig. 9. Training Supervisor Harve P. Cave, left, goes over a production problem with an apprentice in the training shop

Fig. 1. New officers of the Northern Illinois Plant Engineers' Society are, left to right: A. F. Miller, secretary-treasurer; L. T. Puzin, vice president; J. E. Church, president; W. D. Nelms, board member; and S. T. Christensen, board member. S. A. Simonson (standing), Chicago Hardware Foundry Co., was the first president of the Northern Illinois group. A. Paul, of Ammco Tools, Inc., board member, was not present

Fig. 2. H. Leach, Pittsburgh Forgings Co., outgoing president of Pittsburgh chapter of AIPE, turns gavel over to new president, F. C. Williams (right) of Dravo Corp. R. W. Hiller (center), also of Dravo, newly-elected national vice president of AIPE, watches proceedings

Activities of AIPE Chapters

AS THE NUMBER of Plant Engineers' Societies increases so will their activities. Following is a brief report of what some of these Societies are doing:

Northern Illinois

At the annual election of officers, the Plant Engineers' Society of Northern Illinois, a charter member of the American Institute of Plant Engineers, selected the following men:

Mr. J. E. Church, of Fansteel Metallurgical Corp., will take over the duties of president; LeRoy Puzin, of Chicago Hardware Foundry Co., is the new vice president; and Art Miller, Johns-Manville Corp., is the new secretary-treasurer.

William Nelms, of Abbott Laboratories, retiring president, will become a member of the governing board. Other members of the board are: A. Paul, of Ammco Tools, Inc., and S. T. Christensen, of Deepfreeze Appliance, Div. of Motor Products Co.

New York

Twenty-five members and guests attended the panel discussion meeting arranged for the Plant Engineers Association of New York. The subject of the discussion was "Maintenance Cost Control."

Chairman of the panel was Mr. H. Harman, of du Pont, who introduced Mr. John Sayer, Section Manager of Maintenance Engineering, also of du Pont, who gave an interesting talk on du Pont's procedures and methods for controlling their maintenance program.

Messrs. E. J. Hess, of Curtiss-Wright, Bill Starke of Forstmann Woolen, Jim Pinke and Roy Cuny, both of Lederle Laboratories, also explained their procedures. Each had copies of their work order, store requisitions, cost control sheets, etc. and explained how the forms are used.

At the February meeting of the New York Plant Engineers Association, Dr. E. Partridge, Director of Hall Laboratories, Inc., Pittsburgh, talked on gadgets and wonder devices introduced in the field from time to time for softening or purifying water. The discussion later swung over to the more practical subject of the use and action of amines for corrosion prevention and increased heat transfer rates in process equipment.

Kentuckiana

Information on the new officers for the Kentuckiana Plant Engineers' Society for the coming year was recently sent to us on the Society's new stationery. A reproduction of the insignia they adopted appears on this page.

Officers for the coming year will be: J. S. Case, Tube Turns, Inc., president; P. J. Sehlinger, American Air Filter, Inc., vice president; and M. F. Reich, P. Lorillard Co., Inc., secretary-treasurer.

Members-at-Large for one- and two-year terms will be J. H. Murrell, Ford Motor Co., and O. B. Van Hise, P. Lorillard Co., Inc.

Rochester

On the same day Wallace Duncan, plant engineer of the Tobin Packing Co., of Rochester, met with several engineers in the Rochester, N. Y. area to strengthen the Club there. Wallace, a charter member of the Toledo Club before moving to Rochester, was delegate-at-large at the January convention. Engineers in the Rochester area should contact him for details.

New Jersey

Nick Marchak of the Sun Tube Corp. of Hillside, N. J., and a member of the New Jersey Plant Engineers Society, conducted the February meeting of the club and led the discussion. The subject was the selection of personnel. Jack Haskell, formerly a member of the Philadelphia Club and now plant engineer of Otis Elevator Co., Harrison, N. J., was a guest at this meeting along with Dick Morris who outlined briefly the AIPE Convention held in Chicago in January.

Cleveland

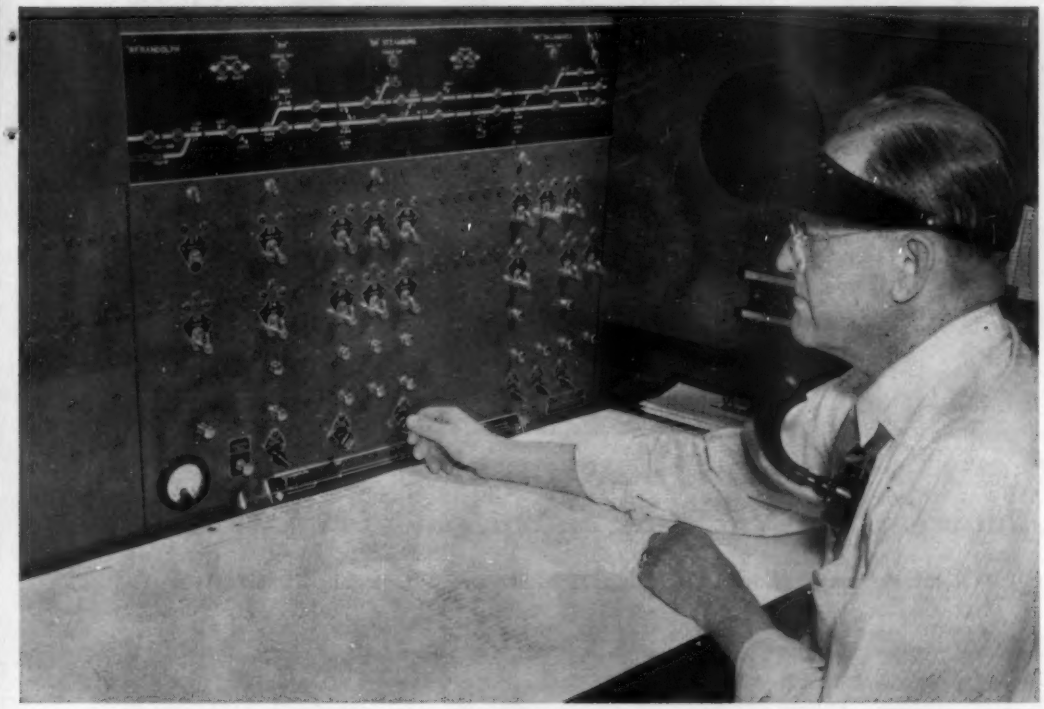
Officers who will take over the duties of the Plant and Production Engineering Division of the Cleveland Engineering society for the 1954-1955 season will be:

Richard A. Harvey, Thompson Prod-

(Continued on page 202)

Photography on Aluminum Sheets
for Production of Nameplates, Diagrams

Processing of pre-sensitized plates with standard chemicals, equipment, is inexpensive method of line and letter reproduction in large or small lot jobs



Track diagram on dispatcher's switchboard of Erie Railroad is produced photographically. White lines show trackage in railroad yards while lights indicate points which have been passed by train

ONE OF THE fairly recent developments in production of nameplates, wiring diagrams on metal, and similar products, has been the Metalphoto process. This process involves the use of anodized aluminum sheets for photographic reproduction using standard darkroom techniques.

Photo processing of the pre-sensitized plates is done in a manner similar to that used with ordinary photographic paper; and is accomplished under standard darkroom conditions. All necessary chemicals are readily available at photo supply dealers and the plates may be printed on any contact printing box with exposure time generally from three to 12 seconds.

After the film negative has been placed on the photosensitive plate, and exposed, the plate is immersed in water, then developed in Kodak D-19 or its equivalent, for two minutes. Plates are then rinsed and immersed in a non-hardening fixing bath (such as Kodak F-24), for two minutes. Thorough washing is the next step.

For toning, to insure jet black images against a metallic white background, the plates are dipped for five minutes in a bath of gold chloride-thiecyanate toner, such as Agfa 231. After that follows another water rinse.

One Special Operation

Finally, to seal the image permanently within the oxide layer, the plates are submerged for 30 min in a boiling solution containing 20 per cent Glauber's salt. This simple step is the only special operation beyond an ordinary paper-type photographic process.

By using multiple negatives of the subject material, it is possible to obtain a corresponding number of final units from each single plate, depending on the sizes involved. The Metalphoto process is extremely convenient where a variety of small quantities is involved, as well as for continuous large scale production. In either case, it is especially notable for its low production costs.

Accordingly, any plant with its own darkroom and photographic equipment can easily utilize the process to realize its exceptional benefits. And because of the low cost and ease of installation of such equipment, any company can set up for its use. It was developed by Metalphoto Corp., 2903 E. 79th St., Cleveland 4, Ohio.

Photos: The Dow Chemical Co.

Fig. 1. Both exhaust stacks were painted on the same day. Stack at left is coated with a silicone resin; stack at right with heat-resistant organic resin. Both surfaces were exposed for over a year to temperatures ranging up to 510 F

Primer on Silicone Finishes

How Plant Engineers Can Cut Down on Equipment Maintenance

By SIDNEY DANOFF, Plant Engineer, Midland Industrial Finishes Co., Waukegan, Illinois

MANY PLANT ENGINEERS have heard of or used silicone products such as polishes, water repellents, lubricants, defoamers, rubber, etc. But how many plant engineers have heard of silicone coatings and their use for maintenance? Probably not many, due to the complexity of silicone coatings and the long-term research necessary to formulate these coatings for various maintenance conditions.

First, what is a silicone? To a chemist, silicones are organo-silicon-oxide polymers. To engineers, silicones are chemical cousins of glass. They are a chemical hybrid, a cross between organic and inorganic materials.

Silicone coatings, which are made from silicone resins modified with organic groups, solve the important problem of surface coating failure after prolonged exposure to elevated temperatures. Silicone surface coatings look like conventional organic coatings and may be applied with the same equipment used for ordinary paints by all the usual methods like brushing, spraying, dipping and roller coating.

Most silicone coatings may be air dried or cured by baking at temperatures up to 500 F, the exact curing cycle being determined by the composition of the vehicle used. In many cases, the product on which the coating is applied becomes hot enough to cure the coating.

Various types of silicone coatings are on the market today. For some applications heat resistant properties of silicone resins were supplemented with desirable features of other compounds to obtain such necessary film characteristics as adhesion, toughness and rapid-drying speed. The chemical or physical addition of other monomers and polymers has given rise to the useful class of modified silicone finishes.

One of the most successful applications of silicone coatings is in the formulation of heat resistant finishes used on ovens, stacks, furnaces, stove pipes and incinerators. These finishes normally are made from aluminum dust pigments, zinc dust pigments and graphite. These pigments must be chosen carefully as they must also withstand high temperatures.

As a general rule it could be said that metallic and graphite pigments properly formulated, will withstand temperatures up to 1000 F. The heat limits for non-metallic pigments is in the range of 650 to 700 F. For exposures under 650 F primers based on silicone resins and zinc chromate and/or iron oxide pigments may be used advantageously under silicone top coats.

An interesting finding in the study of aluminum pigmented silicone coatings showed that mild steel when heated to high temperautres continues to oxidize until it is completely destroyed. With stainless steel a protective oxide which acts as a barrier against further oxidation is found. Investigation confirmed that mild steel products with a silicone aluminum coating may be used in temperatures where steel would ordinarily be oxidized to failure. Even stainless steel needs protection when exposed to 1400 to 1600 F temperatures. Silicone aluminum coatings provide the required protection and prevent oxidation to welded areas.

Normally silicone coatings may be applied to steel which has been wire

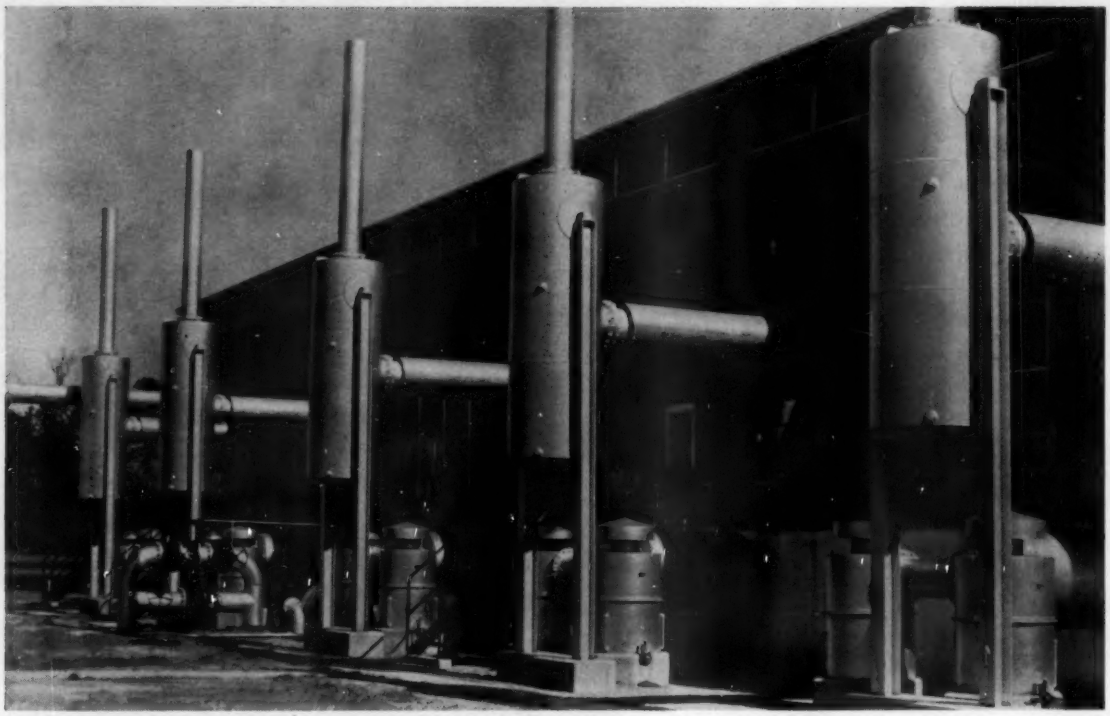


Fig. 2. Exhaust mufflers at this gas pipeline compressor station are still in excellent condition three years after being finished with a silicone-based aluminum finish. Surfaces have been exposed to temperatures in the 600-800 F range

brushed and solvent washed. If the metal is rusty, clean with a metal preparation or similar solution.

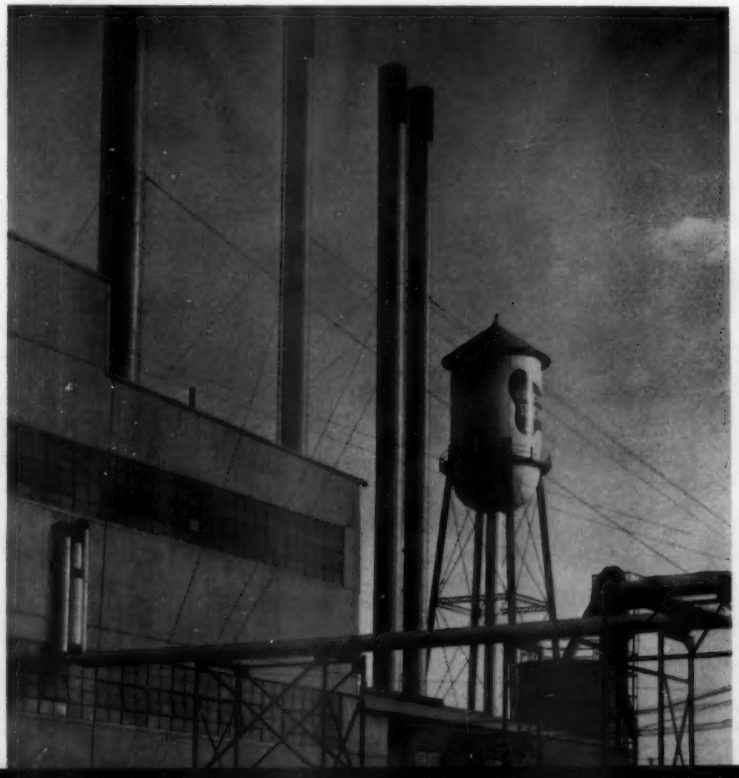
A few examples of the many uses of silicone coatings are as follows:

1. One industry is using an air dried silicone coating for the exhaust system of test cells for jet engines. The exhaust stacks are on the outside of the building and reach temperatures of 600 to 800 F. Not only must the silicone coating in this case withstand high temperatures and weather, but it must also be able to stand high thermo shock—such as great changes in temperature in a short time. In this instance the exhaust system goes from the outside temperature to a 600 F temperature in a matter of one or two minutes.
2. Incinerator finish for outside use.
3. Ovens, boilers, steam lines, heat exchangers, smoke stacks, etc.
4. The automotive industry uses silicones on mufflers and exhaust manifolds.
5. Clear silicones are used for protection of conveyors, wickets, etc., which go in and out of ovens.

As a general rule aluminum and black silicone coatings cost $6.00 to $25.00 per gal. Interior maintenance silicone, in black, will run from $6.00 to $10.00 a gal. (These are only useful where heat is the major problem.) Exterior maintenance silicones will cost $10.00 to $25.00 per gal. Colored silicones such as gray, blue and red, which will withstand 450 to 550 F will cost $8.00 to $30.00 per gallon.

Plant engineers who plan to use silicone coatings must make sure the coatings they select are designed for the specific applications in mind.

Fig. 3. Water tank and powerhouse stacks coated with an air-drying silicone, finish resin still look like new almost a year after the coating was applied



Carbide Tip Brazing—

How Midvale Steel Co. Speeds Tool Tipping, Improves Metal Cutting

By CHARLES A. McFADDEN
Project Engineer
Selas Corporation of America

Fig. 1. Heating time, at this four heating station arrangement at Midvale Steel, is measured in seconds. Station takes but little space

IT IS WELL recognized that greatly increased "feeds and speeds" in metal cutting and shaping operations are possible with carbide-tipped tools. These tools take many shapes and forms—from milling saws to twist drills—and are used for shaping metals, ceramics, plastics, wood, glass, for pulverizing coal, for chopping paper, and so on.

Carbides are generally more costly, however—two to three times the cost of tool steel, size for size—and possess other characteristics, such as low ductility, which suggest the use of a carbide cutting tip attached to a less expensive and more ductile shank.

The carbide can be attached mechanically or brazed to the shank, with about 76 per cent of the tools in use today being brazed. Brazing has been practiced for the past 45 years at Midvale Steel Company, Philadelphia, where long before the advent of cemented carbides, tool steel inserts were attached to carbon steel shanks—using powdered brass and borax flux—with heat supplied by the blacksmith's forge.

A recently modernized Central Tool Department at Midvale includes equipment for brazing tips, but the blacksmith's forge has been replaced by fast heating air-gas burners.

A brazing machine with four heating stations, designed and built by our company, is shown in Fig. 1. Each of the four stations includes a pair of burners, and the heating cycle is automatically controlled by vernier-set electric timers.

The burner resembles a miniature jet furnace, which burns any commercial fuel gas (e.g., natural or manufactured gas, propane, etc.) in a ceramic-lined, high pressure combustion chamber. The ceramic lining acts as a catalyst to speed the combustion reaction and insures that the gas is fully consumed within the combustion chamber. The precise molded manifold plate—also of heat resistant ceramic construction — meters the premixed air and fuel gas and permits a fuel turndown ratio up to 40:1 without backfire or flame blow-off.

Combustion occurs at pressures up to 3 psig and temperatures up to 3000 F. The intensely hot burned—and inert—gases blast out of the restricted nozzle of the burner at velocities as high as 700 fps. Transfer of heat from the burned gas-air to the work is thereby accelerated, and fast heating of the work is accomplished. For durability, the burner is encased in a heat resistant high chrome-nickel jacket.

For brazing the tool tips, these super-heated gases are directed at the tool shank, as shown in Fig. 2. Heat is developed directly in the tool shank and conducted to the carbide insert.

Fast heating, measured in seconds, is coupled with the assurance that the carbide will not be damaged by heat shock, since the intense heat is not applied directly to the carbide.

When brazing the harder, more easily-cracked grades of tungsten carbide, it is generally advisable to bring the heat into the carbide tip slower than if the tip were in the machined recess and subjected to direct heat conduction. The gas-air burners allow free access to the work at all times and thereby permit the placement of the hard grade of carbide on the top of the tool shank, away from the recess and the direct heat. When the proper temperature is developed in the shank, the insert can then be slid into place and very quickly brazed with minimum heat shock.

The so-called sandwich material (which is a copper shim clad with sil-

ver brazing alloy on both sides) is used to silver braze many of the harder carbide inserts. Fast heat as developed by these burners is required to obtain satisfactory results with the sandwich material.

It should be noted that hotter temperatures can be developed in the tool shank with ordinary torch heating, and it is thus possible, in some cases, to use higher melting brazing material than the regular silver alloys.

Operation is fast and simple, with minimum reliance on the operator's skill, because of full mechanical supervision and control of the heating cycle. The pre-assembled tool insert and shank—with pre-placed silver or silver-copper sandwich shim stock and brazing flux—is placed in position between the burners, and the operator presses a button which turns the burners from idling flow to full-on. The timer then takes over control of the heat cycle and the operator is free to load and unload the other brazing stations. At the end of the pre-set time, the brazing alloy has flowed throughout the joint area, and the burners turn down automatically to minimum flow to allow the joint to set sufficiently for removal and replacement with a new tool.

To assure exact duplication of results and to develop maximum combustion efficiency, the fuel gas is premixed in a gas combustion controller, a machine which premixes the low pressure fuel gas to precise air:gas ratio and then compresess the mixture to 3 psig for delivery through a single pipe line to the brazing table. Regulation of the air:gas ratio is accomplished over a turndown ratio of 20:1. Thus, each brazing station can operate completely independent of all others, even though all are suplied by a single combustion controller. The mixture control is adjusted at initial start-off to produce a slightly gas-rich flame and need never again be touched.

Slight excess of gas in the flame envelops the heated area to prevent infiltration of free oxygen and the scaling which would otherwise result. Remarkably clean and scale-free work is thereby produced.

Little Space, Low Cost

The four-station brazing table shown in Fig. 1 requires only 2½ by 3½ ft of floor space and is readily served by a single operator. Production rate varies with tool size, with larger tool shanks requiring more heat and therefore more heating time. In one installation of this equipment, it is reported that a single operator produces more than sixty 2 by 1¾ in. tools per hour. Fuel cost for this production is about $0.35 per hour, based on 700 Btu per cu ft gas at $0.75 per thousand cubic feet, which compares with the former fuel cost of $5.56 per hour for equivalent production using oxygen and acetylene.

This same equipment is also suitable for tool retipping, and the same burners are used to heat the joint to the slightly higher temperature required to remelt the brazed joint. A shank can thereby be used several times, with corresponding cost economies.

Re-tipping of carbide tools can and should, if possible, be handled in a single heating operation without allowing the shank to cool down. In other words, when the tool is heated in the melting point of the brazed material, the old tip should be quickly removed and a new tip laid in place and brazed immediately.

The four-station brazing equipment described is also available with two heating stations for plants with lowered production requirements.

Small shops, with need for only a few tools, also make use of a single-station brazing system which was introduced at Midvale over ten years ago. Since then hundreds of the single-station radiant cup units, shown in Fig. 3, have been installed in tool cribs of small shops both in this country and abroad. To meet the reduced production and intermittent-brazing-operation requirements of the single station units, radiant cup burners are used in the heating of tool shanks. These burners are especially designed for low equipment cost and simplicity, in lieu of the faster heating characteristics of the burners shown in Fig. 2.

Burner pressures with the radiant cup design are considerably lower, and plant compressed air can be used with a mixing tee, which feeds low pressure air-gas mixture to the burners. Plant compressed air is reduced to 15 psig and fed through a needle valve into one end of the mixing tee. Fuel gas at low pressure passes through a check valve—to prevent air from backing up into the gas line—into the side inlet of the tee.

The brazing installation, shown in Fig. 1, now in use for over a year at Midvale, has demonstrated a number

(Continued on page 206)

Fig. 2. Heat from the burners is directed at the tool shank, protecting the carbide tip against heat shock. Operator may tend several of these heating stations at the same time

Fig. 3. For low production and intermittent operation requirements radiant cup burners like these are used in conjunction with small-shop, single-station brazing systems

How and Where To Use Tapes

ONE OF THE MOST useful, and best-illustrated, industrial publications to cross our desk in some time is one with the too-modest title of "Applications of Pressure-Sensitive Tapes for the Metalworking Industry." Actually, the material comprising this 56-page publication has a much wider appeal.

Examples of some of the department headings are shown in the illustration around two sides of this page.

The manual, says the issuer, Minnesota Mining and Manufacturing Co., contains 311 illustrations which show how 47 of the more than 300 pressure-sensitive tapes made by the company can be used by nearly every segment of the metalworking industry.

To facilitate its use the manual is divided into sections covering tape uses for machining and finishing, electroplating, stamping and fabricating, welding, product assembly, painting, product promotion, packaging and shipping, plant maintenance, and various miscellaneous operations. In addition special sections are devoted to office uses; automatic, semi-automatic, and manual dispensing equipment; engineering and development services; and a tape data section covering properties for each of the 47 tapes.

Want a Copy?

Copies of this brand new book are available on request. If you wish Plant Engineering to forward your request just drop a line to The Editor, Plant Engineering, 110 S. Dearborn St., Chicago 3, Ill. Or, use one of the postage-paid cards in the magazine.

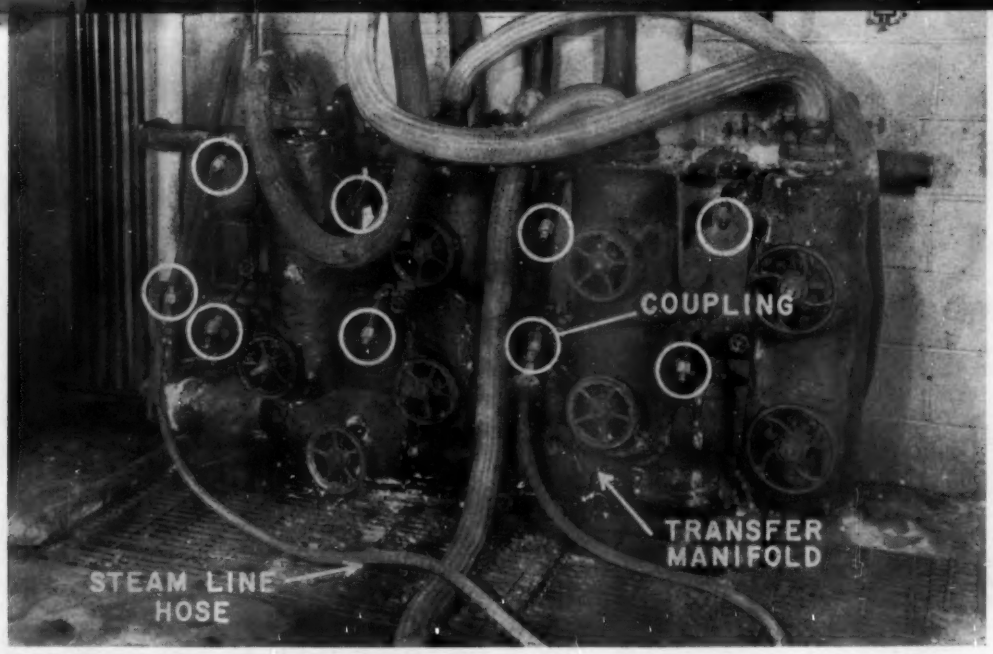


Fig. 1. Flexible hose connects steam line (arrow, left) to any one of the nine transfer line inlets indicated by circles. This arrangement saves cost of permanent piping and a second valve to each of the inlets

Couplings and Hose Cut Costs at Neville Chemical

ONE OF THE TOUGHEST plant housekeeping jobs in industry is that of the operator of a coal chemical processing plant. These plants process and blend viscous, sticky materials, which may change from fluid to solid with a shift of a few degrees in temperature. Processing stills and blending tanks and the transfer lines between them must be cleaned with steam or air after each batch is processed, to prevent contamination of the next batch.

To permit such cleaning action the Neville Chemical Company, Pittsburgh formerly installed permanent piping and appropriate valves to permit feeding steam or air into the processing equipment and its connecting process piping. This entailed the installation of two valves and related permanent piping for each steam or air inlet into the transfer lines.

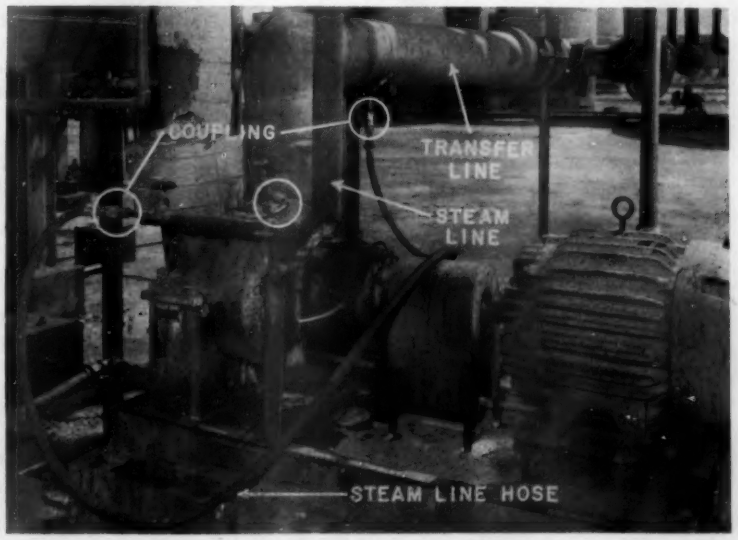
Besides the heavy equipment cost these permanent, valve-controlled steam and air supply lines provided a considerable operational headache for two reasons. First, because frequently the lines run out of doors, hence in cold weather steam would condense in the valves or lines and the condensate would freeze, blocking the line or making valve operation difficult or impossible. In the second place, occasionally a valve would not shut absolutely tight when closed, permitting steam or air to leak into the material being processed with resulting harmful effects on the product.

Neville's plant superintendent conceived this general idea which promised to solve both these problems. Instead of feeding steam or air for cleaning into the product conveying lines through permanent piping and appropriate valves, he recommended that only one permanent piping line be provided for steam or air supply. A flexible hose at the end of this line could be connected to any desired product conveying line by quick-connect hose coupling.

This scheme would eliminate the cost of the fixed piping and one of the valves for connecting the steam and air supply to each product conveying

(Continued on page 204)

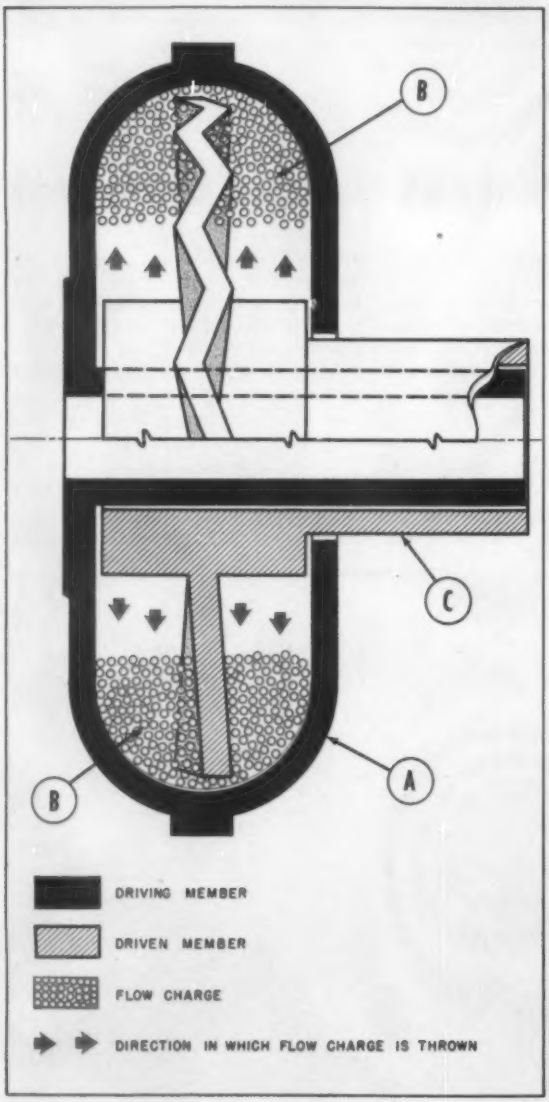
Fig. 2. By use of same size hose and couplings in cleaning all supply lines, Neville Company can shift hose and couplings to any point in the plant



Flexidyne— The Dry Fluid Drive

BASED UPON a completely new principle, a dry fluid drive called Flexidyne is a new development in industrial power transmission. The drive easily handles difficult starting and reversing problems, and gives a new kind of protection against shock and overloads. Its major advantages over other fluid type drives are based on the fact that at normal operating speeds it does not slip, while in the event of an overload, it will slip to give protection.

Line cross section drawing above shows construction of new dry fluid drive. Photo below illustrates installation of Flexidyne on ¾ hp drive, moving foundry cart carrying two tons



Originated in Europe, the drive has been redesigned to American standards by the Dodge Manufacturing Corporation to have wide application for industrial drives involving heavy inertia and shock loads.

The drive is essentially a housing which encloses a rotor that is free to turn concentrically. Between the two elements are fine particles of spherical steel shot, called the "flow charge" which exhibits many properties of a fluid as it transmits power from the housing to the rotor.

When a drive is started, the unit works in the following sequence:

1. The motor, connected to the housing, starts it turning at no load.
2. The flow charge is thrown to the circumference of the housing, is compressed by centrifugal force, and revolves with the housing.
3. The rotor, connected to the load, is started and accelerated by the friction and wedging action of the revolving flow charge.
4. Rotor and housing reach identical speeds; the Flexidyne operates with zero slippage between motor and load at normal running speeds.
5. In case of an overload, the Flexidyne rotor slips relative to the housing, overcoming the friction and wedging action of the flow charge.

The amount of flow charge determines the torque capacity. Since the amount of charge is easily controlled and measured, the Flexidyne will give the exact starting torque needed for anything from the smoothest to the fastest start.

Accurate overload protection is assured, since the unit can be set to slip at loads ranging from 20 per cent over full load torque to as high as peak motor torque. During starting and overload periods, the current draw is at a minimum, because with the standard Flexidyne setting, the motor is never pulled down to less than 90 per cent of synchronous speed.

These features are the result of Flexidyne's new principle, which produces constant torque for a given input speed, regardless of the percentage of slip between the rotor and the housing (which occurs only during starting or overload).

Want More Information?

More information on Flexidyne is yours for the asking. Drop a line to the Editor, Plant Engineering, 110 S. Dearborn, Chicago 3, Ill., or use postage-paid card in this issue

Flat Belts— That Got in the Groove

MUCH HAS BEEN done in the past few years to extend the range and application of belt drives. One of the latest developments in this trend is a longitudinally-ribbed Poly-V belt designed to incorporate features of both flat belts and V-belts into a single belt drive.

Flat belts have been standard industry drives for many years. At one time nearly every plant was driven by a series of flat belts on a line drive running from one central power source—water wheel or steam engine.

Introduction of the multi V-belt concept of power transmission changed much of this and made short center drives possible in most plants because of high grip and positive groove tracking. Combining both these types of drives into a single belt has always offered interesting possibilities to belt engineers.

Pulleys for the drive are machined around the outside circumference with V-grooves that fit the V-shaped ribs of the belt. The mating action of the ribs and sheave grooves produces a grip similar to that produced by other V-belts. Pressure or tension exerted by the strength member within the belt forces the ribs down into the grooves. The rubber in the belt responds to this presure like an incompressible fluid and presses firmly against the sheave groove faces. This results in a gripping action.

Overhang is kept to a minimum with this 12½ in. wide belt on slushmaker at a paper mill in the Northwest

The sharp V shape of the ribs gives easy ingress and egress of the belt to and from the sheave grooves. Several angle pump drives have realized fuel savings up to 30 per cent because of this feature and because the belt is wide and eases the angle of entry into the sheave. Belts on these particular drives are 390-in. long and can be pulled around easily by hand, it is reported.

Slippage of the belt is surprisingly low under proper tension. Application to ten 6-in. sheaves on a six-spindle automatic chucking lathe, for instance, consistently showed only one rpm slip in 1750 rpm under a 46 per cent surge. The low slip rate is due to the low stretch of its synthetic strength member and freedom from radial slip. The amount of pressured area between belt and sheave affects the capacity of any belt drive. Pressured area in a multi V-belt drive is increased by adding more belts to the drive. The same thing is accomplished in the new belt by designing it so the entire ribbed undersurface of the belt contacts the sheave.

Bearing load is greater than belt tensions where there is sheave overhang beyond the bearing. The narrowness of Poly-V drives keep this increase to a minimum. Such reduction, in larger drives especially, has made it possible to eliminate outboard bearings in some cases.

Both cross sections of the Poly-V belt are relatively thin, flexible, and light. The No. 187 section is ⅜-in. thick; the No. 375 section is 21/32-in. thick. This makes the belt relatively light and thus is affected only slightly by high centrifugal tension—an important factor in the calculation of belt drives. Belt speed and centrifugal tension are directly related; the heavier the belt and the higher the speed, the more centrifugal tension tends to make belts stretch and bow away from the sheave because of stiffness. This bowing effect reduces the arc of contact and along with it, the belt's ability to transmit horsepower.

Many of the applications of the new belt made to date are said to fall into the "trouble drive" class. The existing drive was either not performing economically or efficiently—usually because the operation put excessive demands on the drive in the way of shock loads, vibration, sudden stop and start, or high capacity.

Test applications over a period of years have shown that the belt is relatively easy on sheaves. One such installation was on an 80 hp air compressor that had worn out four motor sheaves in 12 years at a cost of approximately $1256.00 in spite of a pivoted base used to control tension. Now, after three years of operation of the drive with a Poly-V belt no wear is detectable in the sheave. The belt required three take-up adjustments during the period to compensate for a stretch of ½ of one per cent.

Low Pressure Steam—

Is It Economical for Plating Room Use?

With correctly-sized coils and piping, says the author, many of the difficulties experienced with low pressure steam are eliminated . . . Example shows how it works

By WM. W. GAYLORD, Consulting Engineer

AS A CONSULTING engineer I am often asked "Can heating boilers —15 lb maximum pressure—be used to supply steam for plating room use?"

This question undoubtedly arises because many systems in which low pressure steam was used have proven unsatisfactory. The long time required to bring the tanks up to operating temperature after the week-end shut-down has caused production bottlenecks. In most cases such inability has been due to a failure to provide boilers, piping and heating coils large enough to handle the load which increases greatly during this period. On the other hand, actual experience has shown that pressures of from 5 to 10 lb gage can and have been used with satisfactory results in installations where these elements in the system have been properly sized.

As an example assume a system consisting of two alkali cleaning tanks of 300 gal capacity each and two hot rinse tanks of 150 gal capacity each. The alkali cleaner tanks are intended to operate at a temperature of 200 F and the hot rinse tanks at 180 F with a flow of 150 gal per hour with water entering at 40 F.

Heat loss by radiation and heat carried away by work will amount to about 32,000 Btu per hour for each cleaner tank. Heat carried away by water, work and radiation will amount to about 177,000 Btu per hour for each rinse tank.

Heat required to heat up tanks from 100 F to working temperature in one hour will be 262,000 Btu for each cleaner tank and 100,000 Btu for each rinse tank.

All tanks to be treated with pipe coils which are trapped to return condensate to boiler.

As the branches from the steam main or branch main to coils in tanks will all be short (probably not over 50 ft equivalent length for pipe, valve and fittings) a high pressure drop can be used, say 80 per cent per 100 ft of pipe. The branch to the coil and pipe for the coil must then be sized to carry the maximum steam required by the coil.

At 5 lb gage pressure each cleaner tank will require a maximum of 273 lb per hour and each rinse tank 185 lb per hour.

It can be seen, on the accompanying chart, that all branches and coils must be of 1¼ in. pipe. The coil for each rinse tank will require 112 ft of 1¼ in. pipe and for each cleaner tank 84 ft of 1¼ in. pipe.

Mains from boilers to branches for tanks should be designed for a much lower pressure drop; not over 5 per cent per 100 ft. This would make the size of main necessary to supply the four tanks, at least a 3½-in. diam pipe.

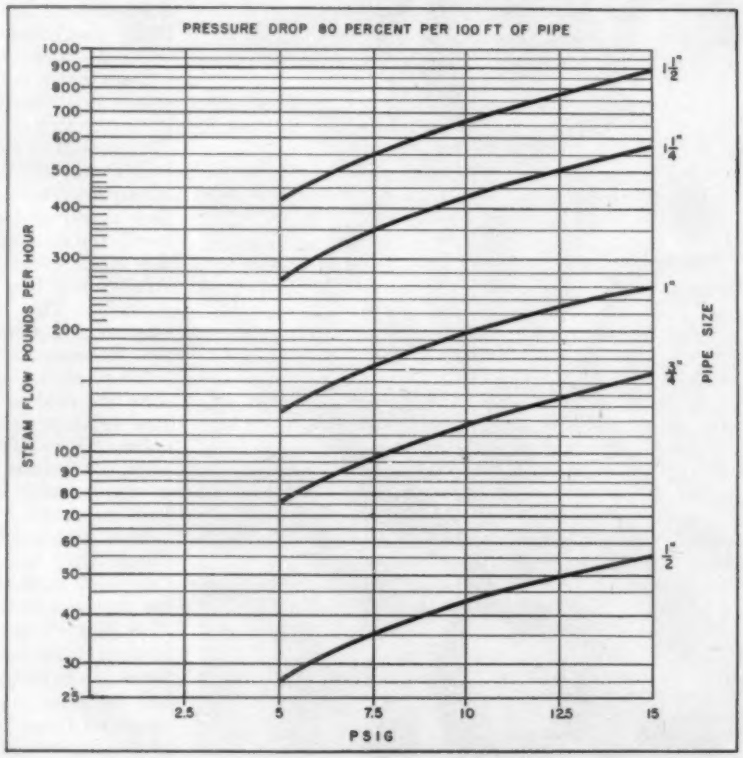
If a boiler is to supply these tanks only it should have a capacity of not less than 860 lb per hour equivalent evaporation from and at 212 deg. This is equivalent to 24.9 boiler horse power. This capacity is required to heat the tanks within one hour after the steam is turned on and the capacity to operate the tanks after they are heated is the equivalent of 14.2 boiler horse power.

Boilers designed for a 15 lb working pressure can be operated at 12.5 lb and this would reduce sizes of pipes and coils as follows:

The coil for each rinse tank will be

(Continued on page 208)

This chart is for determining maximum flow in short lengths of pipe only. It must not be used for runs of pipe greater than 60 ft equivalent length



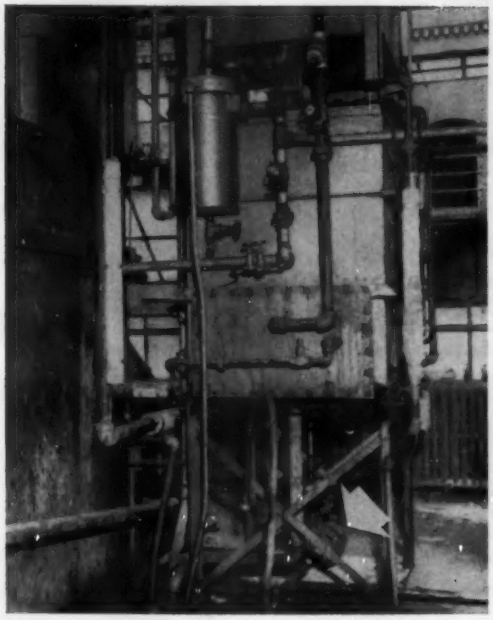


Fig. 1. Above: Portion of degreaser unit is shown at left with position of pump indicated by arrow. Fig. 2. Right: Close-up view of pump which has given 3000 hrs of satisfactory service

Pump Tackles Tough Job at I-T-E

Solves Leakage Problem; Reduces Maintenance

Pumping trichlorethylene presented quite a problem at the Philadelphia plant of I-T-E Circuit Breaker . . . It was necessary to repack the former pump several times a week . . . Installation of a seal-less pump did the trick

IN JULY, 1953, the I-T-E Circuit Breaker Co. installed a distillation-type degreaser in its Philadelphia plant. The pump used to move trichlorethylene in the degreaser began to give trouble from the start. The temperature of the trichlorethylene being pumped is approximately 185 F.

Two weeks after the operation started, the pump had to be repacked. It was later repacked every week, and subsequently scheduled for repacking two and even three times a week.

Practically every known packing was tried. Special types of solid packing were also used, still with no success. The trichlorethylene ate away the packing, packing lubricant, etc. In addition, the pump shaft was scored, intensifying the packing problems.

In December, 1953, a ⅓ hp Chempump was installed. Combining the motor and pump in one compact package, this pump eliminates mechanical seals, stuffing boxes and packing glands, thereby reducing pump maintenance problems. Another interesting feature is the bearings which can be replaced by hand without special tools and without breaking the pipeline connections.

Fluid Is the Lubricant

The pump is so designed that the pumped fluid, trichlorethylene in this case, is allowed to enter the rotor chamber. A stainless steel liner, inserted in the air gap of the motor, isolates the stator section. The trichlorethyelene circulates through the chamber around the rotor and bearing assembly, giving constant lubrication.

Wetted pump parts are of cast iron, the bearings are of graphite and the input power is 3 phase, 60 cycle, 220/440 volts.

Before the pump was installed, I-T-E- was losing, through stuffing box leakage, approximately 10 gal of trichlorethylene every night with the pump shut down. Every 24 hours they lost about 25 gal. With trichlorethylene costing approximately $1.80 per gal, they were losing about $45 every day, just through leakage. This does not include the cost for packings and shafts as well as the labor and overhead involved.

The new pump has operated 3,000 hours with no reported leakage and no need of maintenance. By eliminating the stuffing box leakage, the pump paid for itself in less than 10 days.

Freight-Handling Van Takes Train or Truck Rides, Stands Still for Storage

TRANSPORTING FREIGHT by combining the most economical aspects of truck and rail transportation is the aim of a system originated by Clark Equipment Co., manufacturers of materials handling equipment.

The Clark Mobilvan system not only functions in the movement of freight, but its storage, serving as a mobile warehouse. Adaptable to use with either truck or rail transportation, the system is based on the use of a lightweight van, 17 ft long, 8 ft wide, and 8 ft high. The van is designed with automatic locking devices adaptable to a railroad flatcar or a flatbed highway truck.

The 17-ft length permits loading three vans on a standard railroad flatcar, or on a conventional 35-ft highway trailer.

Once loaded, the van is hauled to the railroad freight terminal, removed from the highway truck by a fork-lift truck or a straddle carrier and placed aboard a railroad flat car. Or, the container could be carried by truck to a trucking terminal to be combined with another Mobilvan on a highway trailer for a long overland haul.

An important advantage of the van is that, following delivery, the container can become a storage structure.

New Extrusion Facilities Added by J & L to Produce Custom Shapes

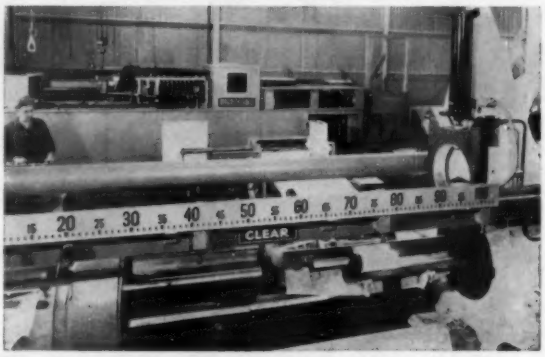
PRODUCTION of "custom-made" extruded carbon steel sections by the Ugine-Sejournet process has begun at Jones & Laughlin Steel Corporation's new hot extrusion plant in Pittsburgh, Penna.

The extrusion press was designed to J&L specifications and built by Loewy-Hydropress, Inc. It is hydraulically powered, with a horizontal stroke, and can operate at pressures up to 1,000 tons.

The billets are heated in an induction heater, which is provided with an inert gas atmosphere. Each billet passes through a pre-heat coil, then through a high-heat coil, where it is heated to 2300 F. The two heating steps take only a minute.

Emerging from the heating units, the billets roll through powdered glass, which serves as a die lubricant. An automatic loader picks up the billets and transfers them to the loading end of the press.

In the extruding operation, the hydraulic ram positions the hot billet, then pushes it through the die. Conveyed



automatically to a cooling bed, the extruded bar is cooled, then stretcher-straightened and de-twisted. A shot-blasting machine cleans glass and scale from the bar.

Electric Test Panel for United Nations Building Makes Testing Easy

AS A MEANS for cutting down on manhours and repair costs, B. Eichwald & Co., responsible for the electric operation and maintenance of the United Nations buildings, devised equipment for accurately testing hundreds of different types of electrical equipment in use at the UN—from electric coffee makers to intricate motors.

Specifically, the equipment is in the form of a 4 ft by 8 ft electric test panel, used to make tests on motors, heaters, lamps, relays, fluorescent starters, motor starters, etc.

Source of energy for the panel is a 3-phase, 4-wire 120/220 volt lead, with rheostats in each phase.

Voltages of 1 to 220 volts may be obtained from the line directly, adjusting with rheostats. Higher voltages to 5000 volts may be obtained from transformers. Voltmeters and ammeters are built in each phase, and provide an immediate check of any equipment on test.

Capacitors of 400 mmf to 40 mf may be measured directly on a built-in bridge. A multiple series lamp arrangement is provided for testing lamps, fuses and for probing motor windings. A tapped transformer is available to supply circuits of 2½, 5, 6, 12 and 24 volts as desired, and one-, two- and three-phase twist lock outlets and pin plug outlets are provided on the board for series or across the line operation.

For more facts circle 569 on Reply Card ——→

REEL SAVINGS FOR YOUR PLANT

WAYNE *Production-Booster* HOSE REELS

STOPS PROFIT ROBBING ACCIDENTS—No suspension cables or coils of loose hose to trip over. Operator reels out only hose length needed, releases it like a window shade for automatic rewind.

ELIMINATES WASTE MOTION—Air supply and tool suspension are combined. Air tool is within easy reach at all times. Wayne Production-Booster Hose Reels increase output, reduce assembly costs, lessen worker fatigue.

SAVES HOSE . . . PROLONGS LIFE—Hose is always reeled up . . . cannot be walked on, crushed by industrial trucks. Hose lasts longer . . . maintenance and replacement costs lower.

EASILY INSTALLED in any position. Hose lengths 15′ to 50′.

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Wayne
Industrial Products

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LIFTS

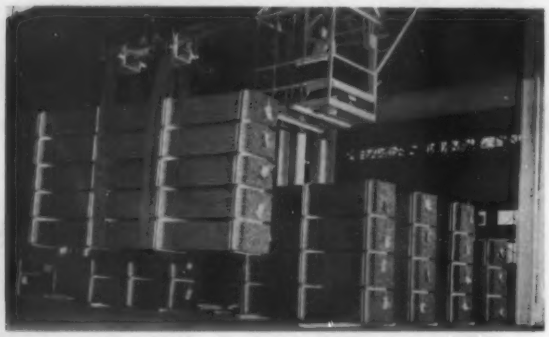
LUBRICANT DISPENSERS

INDUSTRIAL PUMPS

INVADER PUMPS

New Mills for Production of Welded Aluminum Tube Start Operations

PRODUCTION HAS BEEN INITIATED on two new aluminum welded tube mills at the Aluminum Company of America works at Alcoa, Tennessee.



The new mills provide capacity to produce welded aluminum tube and pipe from ½ in. to 8 in. diameter; one will produce ½ in. to 4 in. OD tube, the other can make 2 in. to 8 in. OD tube.

The first products available from the new mills include 1-in. welded furniture tube and three sizes (3 in., 4 in., and 6 in.) of welded irrigation pipe (construction pipe).

The operation of the new welded tube mills is continuous, beginning as a coil of aluminum strip is fed into levelling rolls which flatten it for forming and welding. The strip is roll-formed into a tubular shape after edge trimming and passes through a short inductor coil where the unjoined edges of the pipe are fused together by induction welding.

The mechanical properties of welded tube are approximately the same as those for the drawn and extruded products where the same alloys are used. The tolerances, including wall thickness, are superior to extruded tube and approximately equal to drawn tube.

Field Test on LPGas for Industrial Trucks Prompts Conversion "Service Station" Line

SAVINGS EFFECTED by the operation of internal transportation equipment using propane (LPG) instead of gasoline are now on record with Douglas Aircraft Co., at Santa Monica, Calif. In an exhaustive test running for five months, Douglas found substantial difference in the fuel cost per engine hour and the maintenance costs per hour between propane and gasoline, and they found that there is a saving resulting from longer engine life and less frequent overhauls.

To conduct the test, the American Liquid Gas Corp., Los Angeles, furnished the LPGas, a dispensing unit and facilities for converting the engines on the test units. Equipment selected for the test consisted of four Clark industrial tugs and two Yale fork-lift trucks. Half of the units were converted and operated on propane, and the remainder were operated on gasoline.

Data was collected on fuel consumption, oil and filter changes, oil consumption, fuel and combustion system maintenance, and amount of actual engine operation.

Projecting the savings shown in test results, and applying it to 103 units operating in the plant, a saving of $9,560 per year for the 103 units, was indicated, based on fuel, fuel system maintenance and combustion system cost reductions alone.

Douglas has installed a 450-ft pipeline from its storage tanks to its garage service station so that both gasoline and propane can be dispensed at one facility.

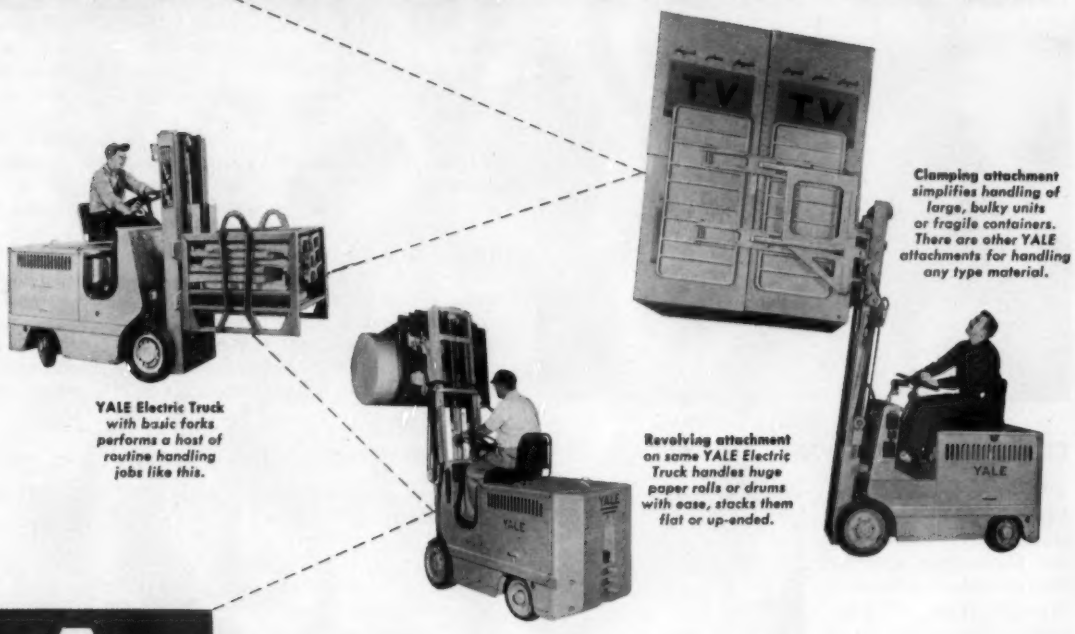
Load Cells Keep Tabs on Freon Storage Tank to Check Usage

PROBLEMS IN HANDLING FREON during production of household products in pressurized dispensers were solved at the Easthampton, Mass., plant of Stanley Home Products, Inc., by installation of a continuously recording and weight indicating system for two 15,000 gal storage tanks.

Complete efficiency in handling of large volumes of Freon in and out of two storage tanks without loss presented the greatest problem to plant engineers. Running a single mechanized production line at rated capacity for a week uses more than 15,000 gallons of Freon, and with high usage, leakage and evaporation control requires unusual precautions in unloading, feeding production lines and in guarding against system leaks.

Weight is the only satisfactory measure of stored quantities, because it is not affected by pressure and temperature. The continuous weighing of the two tanks was simplified by using Baldwin SR-4 compression-type load cells, of 50,000 lb capacity each, as supporting members on the base at each end of each tank. These cells act as weight transducers, measuring the quantity of Freon available for use, with the weight of tank and supporting structure zeroed out in the calibration.

Q. HOW MANY TRUCKS HERE?



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Revolving attachment *on same YALE Electric Truck handles huge paper rolls or drums with ease, stacks them flat or up-ended.*

Clamping attachment *simplifies handling of large, bulky units or fragile containers. There are other YALE attachments for handling any type material.*

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For more facts circle 570 on Reply Card

Cutting Tools Dipped into Peelable Plastic for Storage and Handling Protection

PROTECTIVE PACKAGING of cutting tools at the Carrier Corporation, Syracuse, N. Y., was formerly done with masking tape—a method that was time-consuming to both the packager in the tool crib and the user at his machine.

Primary use of packaging was to protect the edges of new and reground cutting tools in the plant. Up to 18,000 single point cutting tools are handled each week, in addition to smaller cutters and inserted tooth cutters up to 6 in. in diameter.

Carrier now protects its cutting tools with peelable plastic coating of butyrate plastic. Five large melt tanks are in use to liquefy the plastic for dipping the tools, and the company's supervisor of tools and supplies orders the butyrate plastic in large quantities in slab form.

The plastic coating protects the teeth and cutting edges of the cutting tools from accidental chipping, either during storage or in transit from grinding room to tool crib, to machine tool. When it is taken out of the tool crib to be used on a machine, the machine operator carries the tool to his machine, still coated and protected, and removes the peelable plastic just prior to inserting it in the machine.

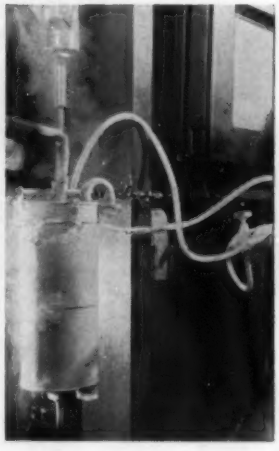
Cloud for Radioactivity

WORKERS at the Hanford Atomic Products Operation have installed a new fibrous glass filter for the removal of radioactive particles from exhaust gases. The installation is at the facilities operated by General Electric for AEC.

The company will use the bed of glass fibers, which is seven feet deep and 56 feet long, to assure the maximum removal of radioactive material. It is believed that the fibrous filter bed will be a more efficient and less costly alternative to sand filters.

Low Temperature Laboratory

SCIENTISTS at the Research Laboratories of Westinghouse Electric Corporation have developed what is considered the world's first pint-size metals stress and strain testing chamber.



Metal test samples, about one inch long and ¼ in. in diameter are mounted between two special-alloy rods that grip the sample securely. Liquid nitrogen is forced into the chamber, to cool it from room temperature to —320 F, then the liquid helium lowers temperature to –452 F.

Office Dictating Equipment Conquers New Field in Inspection Training

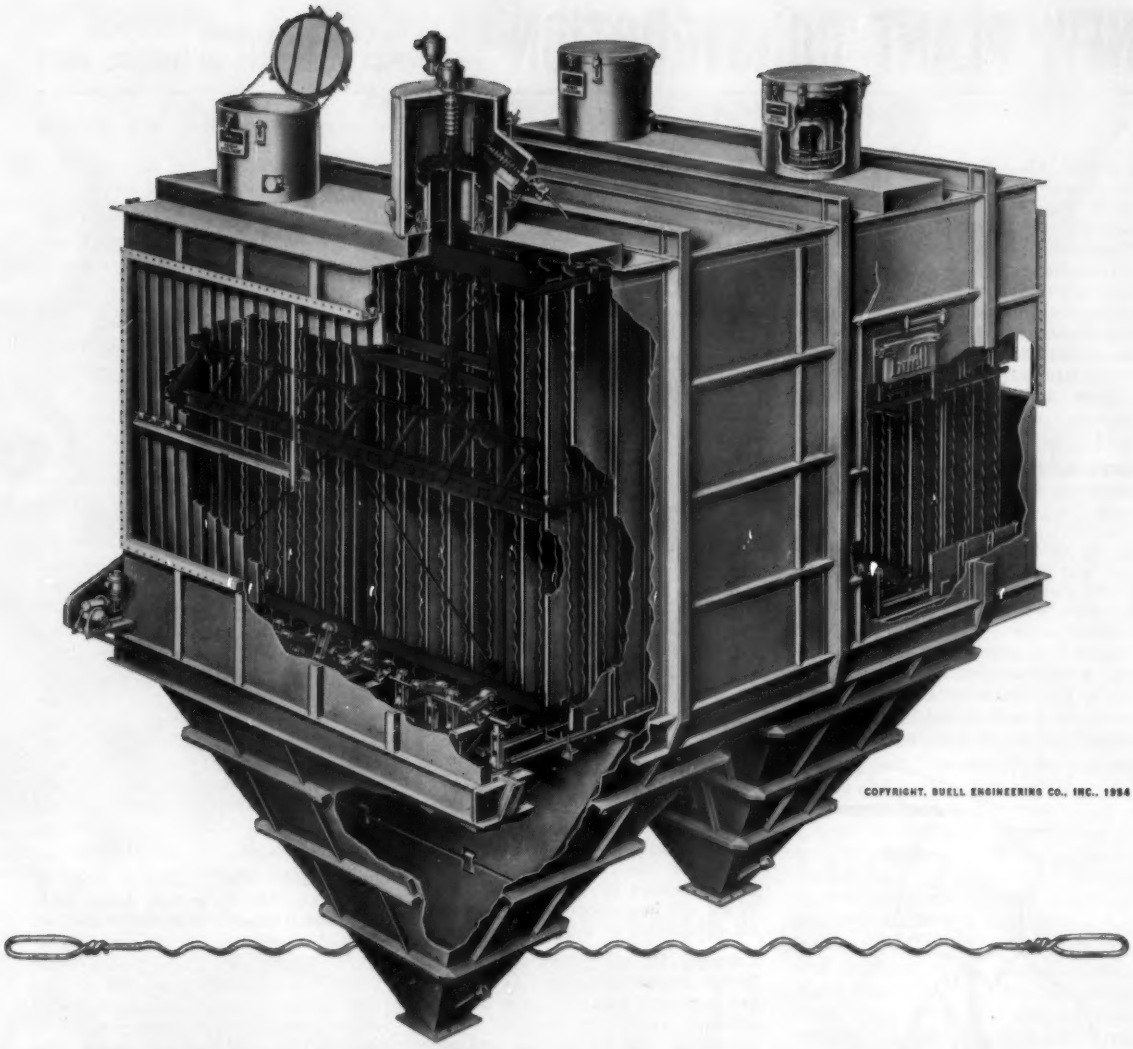
DICTATION EQUIPMENT, usually confined to office areas, may find widespread application in the plant, if the lead of the Gray Manufacturing Co., manufacturers of Audograph dictating machines, is followed.

A new system of training inspectors with dictating machines has proved highly successful at Gray, in the manufacture of complex machinery.

Until recently, Gray faced the problem of training inspectors of the machines that it produces, including a telephone answering and recording set. This machine is complex and requires careful and accurate training of inspection personnel. Usually done by experienced inspectors taken from the job, the training program interfered with production and reduced output.

One of Gray's dictation machines solved the problem. The complete inspection procedure is dictated on an Audograph disc, which the trainee inspector listens to as he learns the job. The disc is recorded by a trained inspector, as he makes a typical inspection, and the record is available to train new inspectors. The experienced man is then free to return to the assembly line to continue his job of inspection at production rates.

Gray finds that new inspectors can become proficient in one day, even with inspection cycles as long as 30 minutes.



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For more facts circle 571 on Reply Card

NEW PLANT CONSTRUCTION — advance information on location, costs

Prepared by Le Roy W. Allison

Tarrant, Ala.—Ketona Chemical Corp., recently organized, temporary address P. O. Box 354, Birmingham, Ala., an interest of Alabama By-Products Corp., First National Bank Bldg., Birmingham, has plans maturing for new chemical works at Tarrant, for production of anhydrous ammonia and other nitrogen solutions. It will comprise several large one-and multi-story structures, with processing machinery and other equipment for a capacity of 45,000 tons per annum. Cost reported in excess of $7,500,000.

Antioch, Calif.—E. I. du Pont de Nemours & Co., Inc., Organic Chemicals Div., Nemours Bldg., Wilmington, Del., has taken over tract of about 500 acres of land near Antioch, and will use site for two new division plants, one for manufacture of tetraethyl lead fluids for gasoline additives, and the other for production of Freon fluorinated carbons for air conditioning, refrigerating and kindred service. Each will comprise several one and multi-story structures. Will represent investment of several million dollars.

Corona, Calif.—Gladding, McBean & Co., 2901 Los Felix Rd., Los Angeles, Calif., structural clay wares and other ceramic products, plans new branch plant near Corona (Riverside County) where tract of 150 acres of land has been acquired. It will comprise several one-story structures, equipped for manufacture of brick, hollow tile and other heavy clay products. No estimate of cost announced—reported over $1,500,000.

Downey, Calif.—North American Aviation, Inc., 12214 Lakewood Blvd., aircraft equipment and parts, electronic apparatus, has plans nearing completion for new one-story addition, about 200,000 sq ft floor space. Cost reported over $850,000. Daniel, Mann, Johnson & Mendenhall, Los Angeles, Calif., are architects and engineers.

Gardena, Calif.—Minneapolis - Honeywell Regulator Co., Gardena, controlling and measuring instruments, has plans under way for new addition to local plant, to be one-story, about 100,000 sq ft floor space, reported to cost over $500,000. Bids for construction will be asked soon. Kenneth H. Neptune, Los Angeles, Calif., is architect. Main offices of company are at 2753 Fourth Ave., South, Minneapolis, Minn.

Long Beach, Calif.—Kaiser Gypsum Co., 1924 Broadway, Oakland Calif., wall board, plaster and other gypsum products, plans expansion and improvements in branch plant at Long Beach, including several additional buildings and installation of equipment for increased capacity. Cost reported about $2,500,000. Kaiser Engineers, first noted address, are consulting engineers.

Atlanta, Ga.—Atlantic Steel Co., 1356 Mecaslin St., N. W., steel bars, steel forgings and stampings, galvanized steel products, etc., has authorized a large expansion program at local mill, with installation of a new merchant bar and rod mill unit, electric furnace and other equipment. Complete program reported to cost over $8,000,000. Work will begin soon and is scheduled for completion in 1956.

Chicago, Ill.—Olson Rug Co., 2800 North Pulaski Rd., rugs and carpets, has approved plans for new six-story addition, about 135 by 265 ft, with extension, 110 by 225 ft, for which work on superstructure will begin soon. Cost reported over $4,000,000. Quinn & Christiansen, Chicago, are architects.

Morton Grove, Ill.—Avon Products Co., 30 Rockefeller Plaza, New York, N. Y., cosmetics, perfumery, etc., has plans maturing for new plant at Morton Grove. It will consist of a main one-and multi-story building, with processing and other equipment for large capacity. Cost reported close to $2,000,000. Skidmore, Owings & Merrill, Chicago, Ill., are architects.

Hammond, Ind.—Calumet Nitrogen Products Co., care of Standard Oil Co. of Indiana, 910 South Michigan Ave., Chicago, Ill., recently organized as a joint subsidiary of last noted company and Sinclair Refining Co., 600 Fifth Ave., New York, N. Y., has plans maturing for new chemical works at Hammond, for manufacture of anhydrous ammonia and nitrogen solutions. It will comprise several large one and multi-story structures, with installation of processing and other machinery for a rating of 300 tons per day. Cost reported in excess of $10,000,000.

Winslow, Me.—Scott Paper Co., Chester, Pa., tissue and other papers, has authorized an expansion program at branch mill at Winslow, comprising several additional buildings, with installation of equipment in pulp division and paper-making department for large increased capacity. Cost reported close to $6,000,000.

Baltimore, Md.—Bethlehem Steel Co., Bethlehem, Pa., has authorized a large expansion and improvement program at branch plant at Sparrows Point, Baltimore. A number of new structures will be erected, with installation of rolling mill and other machinery for production of finished steel products. Proposed to increase present capacity by one million tons per annum. Cost reported about $75,000,000.

Lanham, Md.—Coca-Cola Bottling Co., Roseneath Rd. and Clay St., Richmond, Va., beverages, has plans for new mechanical bottling works on Ritchie Ave., Lanham (Prince Georges County). It will be one-story, with automatic bottling machinery and other equipment for large capacity. Cost reported over $850,000. J. J. Schlossler, Washington, D. C., is architect.

Luke, Md.—West Virginia Pulp & Paper Co., 230 Park Ave., book, kraft and other papers, has authorized an expansion program at mill at Luke, to be carried out over a period of months. Work will comprise a number of new one- and multi-story structures, with installation of new equipment for pulp manufacture and finished paper production. Cost reported close to $20,000,000.

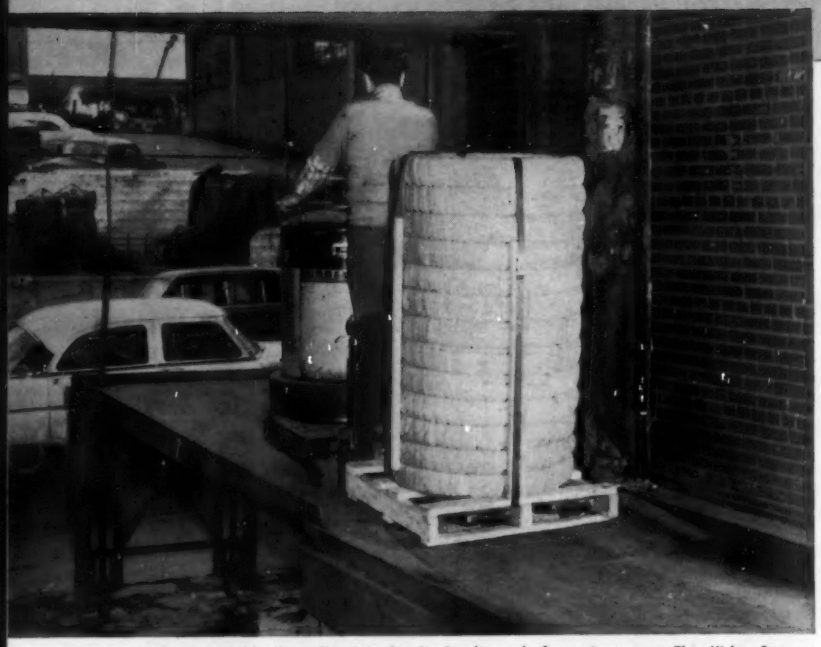
Red Wing, Minn.—Burdick Grain Co., Grain Exchange Bldg., Minneapolis, Minn., grain, animal feed, etc., plans new grain terminal at Red Wing. It will comprise several one- and multi-story structures, with elevating, conveying and other mechanical-handling equipment. Cost reported over $500,000.

Dedham, Mass.—Atlantic & Pacific Tea Co., 530 Atlantic Ave., Boston, Mass., has plans for new bulk warehouse for storage and distribution at Dedham, near Boston. It will be one-story, with large floor area. Packaging and mechanical-handling equipment will be installed. A refrigerating plant will be included. Entire project reported to cost in excess of $500,000.

St. Joseph, Mo.—Dannen Mills, Inc., soy bean products, grains, animal feed ingredients, etc., has plans maturing for new barge terminal on bank of Missouri River, adjoining mill. It will comprise several one-story buildings,

For more facts circle 572 on Reply Card——→

Superior Railway Products Corp. uses Multigrip to *safe-tread* their loading equipment



For safety's sake this "traveling" hydraulic loading platform—in use at The Kirby Storage and Transfer Co., Pittsburgh—is made of Multigrip. The platform travels out to where the truck can be easily loaded, and then travels back.

This portable, adjustable loading ramp is made of Multigrip too. The front leaf only need be raised as one truck leaves and another backs up to the platform.

TO BE SURE of maximum traction at all times for busy feet and wheels, Superior Railway Products Corp., of Pittsburgh, have safe-treaded the loading equipment they manufacture (see cuts) with USS Multigrip Floor Plate. Multigrip's sure-grip, never-fail risers prevent accidents from slips and skids (even when it is wet) wherever it is used.

You can install Multigrip with a minimum of trouble and expense for it is easy to cut and bend as necessary; it is available in large sections, reducing cutting waste; and its pattern is symmetrical, making it easy to match the sections. Multigrip lasts for years—it doesn't crack, chip, rot or splinter as other flooring materials do—requires practically no maintenance and is easy to keep clean.

Benefiting from the experience of others, it will pay you to make a careful check of all the potential danger spots in *your* plant or shop. Don't overlook: aisles around machinery, all ramps and stairs, runways and catwalks, warehouse floor and loading areas, and the entire plant floor area too. Multigrip protects your floors as well as your workers . . . all heavy traffic areas should be protected with heavy duty Multigrip for longer life. Can be used as a covering or structurally.

SEE The United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

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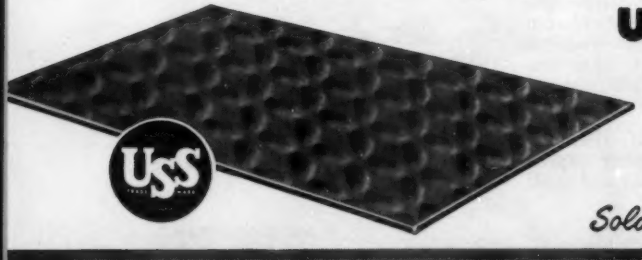
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



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UNITED STATES STEEL

NEW PLANT CONSTRUCTION

with tanks and other storage and distribution facilities, with capacity of one million gal. Cost reported over $500,000.

New York, N. Y.—International Paper Co., 220 East 42nd. St., is selecting a site in South for a new newsprint mill, exact location to be determined soon. It will consist of a series of one- and multi-story structures for pulp division and paper-making department, with machinery and facilities for a rated output of 100,000 tons annually. Project will represent a reported investment of about $20,000,000. Propose to have mill in service in 1956.

Niagara Falls, N. Y.—E. I. du Pont de Nemours & Co., Inc., Electrochemicals Dept., Buffalo Ave., will carry out an expansion program at local plant, for increased production of polyvinyl alcohols. Work will include several new buildings, with installation of processing machinery and other equipment. Cost reported about $3,000,000. Main offices are in du Pont Bldg., Wilmington, Del.

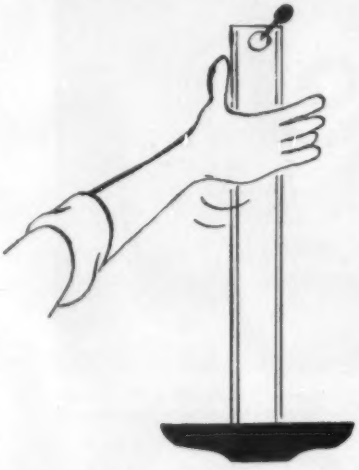
Stony Point, N. Y.—United States Gypsum Co., 300 West Adams St., Chicago, Ill., wallboard, insulating board, acoustical board, etc., has purchased tract of about 50 acres of land as site for new plant for production of gypsum board products. Plan to erect several one-story buildings. Cost reported over $2,000,000. Work is scheduled to begin soon with completion in November.

Tonawanda, N. Y.—Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., 361 Delaware Ave., Buffalo, N. Y., wire cloth, wire rope, steel plates, and other steel products, plans an expansion and modernization program at plant on River Rd., Tonawanda, including several new buildings and installation of additional equipment. Cost reported over $3,500-000. Main offices of parent company are in Continental Oil Bldg., Denver, Colorado.

Alliance, Ohio—Miller Mfg. Co., 5919 Tireman Ave., Detroit, Mich., automobile tools, wrenches and other mechanical specialties, plans new branch near city limits of Alliance, where tract of 28 acres of land has been secured. It will be one story, totaling about 150,000 sq ft floor space. Cost reported about $3,000,000. Proposed to have plant ready for service by close of year.

Columbus, Ohio—Big Bear Stores Co., 770 West Goodale St., food store chain, has plans for new bulk storage and distributing plant on local site. It will be one-story, comprising several units, totaling over 60,000 sq ft floor space. A refrigerating plant will be installed. Complete mechanical-handling equipment for conveying, loading, etc., will be provided. Entire program is estimated to cost about $2,500,000. Charles W. Cloud, Columbus, is architect.

Dayton, Ohio—National Cash Register Co., South Main and K Sts., cash registers and other accounting and tabulating machines, and parts, has approved plans for new three-story addition, about 240,000 sq ft floor space, to be equipped in part for increased capacity. Cost reported about $2,000,000. Work will begin soon. This is part of a 1955 expansion and modernization program authorized by company, to cost about $16,000,000.



Portland, Ore.—Owens-Illinois Glass Co., Ohio Bldg., Toledo, Ohio, glass bottles and containers, plans new branch plant at Portland, where tract of about 70 acres of land has been secured. It will comprise several one- and multi-story buildings. Two glass furnaces will be installed. Cost reported over $2,000,000.

Deshertown, Pa.—Selas Corp., of America, Inc., Erie Ave., Philadelphia, Pa., heat-treating equipment, custom heat-treatment units, etc., plans new plant at Deshertown (Montgomery County), where tract of 10 acres of land has been purchased. It will be one story with about 110,000 sq ft floor space. Cost reported close to $1,000,000. Work will begin at early date.

Marcus Hook, Pa.—Sinclair Refining Co., 600 Fifth Ave., New York, N. Y., oil, gasoline, etc., a subsidiary of Sinclair Oil Co., same address, will carry out an expansion and modernization program in oil refinery at Marcus Hook, with installation of crude oil distillation equipment and other machinery, with rating of 60,000 bbl per day. Cost reported about $12,000,000.

Spring Grove, Pa.—P. H. Glatfelter Co., book, writing and other papers, will carry out an expansion and modernization program at local mill, with installation of new pulp equipment, paper-making machine and auxiliary facilities to increase capacity by 33,000 tons of fine papers per annum. Entire project will represent a reported investment of about $12,500,000.

Pittsburgh, Pa.—F. & B. Woodenware Co., 5556 Center Ave., general woodenware products, plans new plant on local site on Saw Mill Rd., to be one-story, about 150 by 500 ft. It will be equipped for large increase in present capacity. Cost reported over $800,000. Bids for erection are expected to be asked soon.

Bethune, S. C.—Kendall Co., Walpole, Mass., absorbent cotton, print cloths and other textile products, plans new branch mill for finishing service at Bethune, where large tract of land has been acquired. It will be one story about 300,000 sq ft floor space. Cost reported over $2,500,000. Lockwood, Greene Engineers, Inc., Spartanburg, S. C., is engineer.

Johnston, S. C.—Riegel Textile Corp., Trion, Ga., flannels, sheetings and other cotton fabrics, has preliminary plans for new branch mill at Johnston, where site has been selected. It will be one story, about 150,000 sq ft floor space. Cost reported over $400,000. Propose to begin work this spring.

Chattanooga, Tenn.—Combustion Engineering, Inc., 911 West Main St., boilers, stokers, pulverizers, water heaters, etc., has plans maturing for new foundry at local plant for production of cast iron pipe. New unit will be completely mechanized and equipped for large capacity. Cost reported close to $2,000,000. Contract for construction is scheduled to be made soon. Main offices are at 200 Madison Ave., New York, N. Y.

Houston, Tex.—Sinclair Refining Co., Gulf Bldg., Houston, refined oils, gasoline, etc., has authorized an expansion and modernization program at local oil refinery on LaPorte, Rd., with installation of a new catalytic reforming unit and auxiliary equipment for large increase in output of high-octane gasoline. Steel tank storage facilities will be enlarged. Entire program reported to cost close to $16,000,000, with completion scheduled in spring of 1956. Main offices are at 600 Fifth Ave., New York, N. Y. Company is a subsidiary of Sinclair Oil Co., last noted address.

Lufkin, Tex.—Southland Paper Mills, Inc., newsprint, has plans for expansion in mill, comprising a third unit for large, increased capacity. Work will consist of several one- and multi-story buildings, with installation of new pulp equipment, paper-making machine and accessories. Cost estimated over $10,000,000. Completion is scheduled in 1956. Brown & Root, Inc., Houston, Tex., engineer-contractor, has prepared plans and will supervise construction.

Q. What does the Continental Automatic Boiler have that no other similar type boiler has?

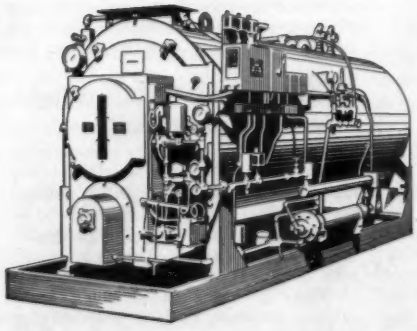
A. A special front-end design that employs two concentric rows of guide vanes which direct air in a spinning stream into the boiler, forming, in effect, a multiple-lead air-screw that provides uniform delivery of air and thorough mixing of air with fuel. Result: high rate of heat transfer to the surrounding water-cooled furnace — a reason why this 2-pass boiler has an efficiency of over 80% guaranteed.

Q. What outstanding features do the manufacturers of the Continental Boiler claim?

A. A special tube-sheet design that assures long service life. Water circulation that is uniform, free, rapid. 2-pass design that provides even flow of combustion gases to all heating surfaces. Heating surfaces arranged so that there is a centrally located furnace and equal spacing of all return tubes. Simplified construction that affords ease of accessibility and economy of maintenance.

Q. What was the comment made by an engineer who has followed packaged boiler design and construction for many years?

A. At the recent Power show this man gave an unsolicited testimonial. He said: "I've seen them all and I've never seen a packaged boiler built as well as this one." He specifically commented on the quality of the construction and the simplicity of build on the Continental Boiler.



Q. How can you get all of the facts on the Continental Boiler?

A. Right now, write for Bulletins BE3 and BE4 that describe the boiler and the "spinning gas technique". Write to Boiler Engineering & Supply Co., Inc., Phoenixville, Pa.

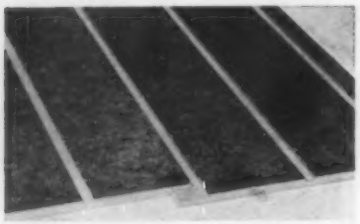
For more facts circle 573 on Reply Card

NEW PRODUCTS AND PROCESSES summarized for your convenience

Edited by M. E. Heniken

1—PANEL SIDING features new grooved design

Panelgroove is a new panel siding of 5/16-in. Tempered Presdwood with ⅜-in. wide and 1/10-in. deep grooves, spaced 4 in. on center. The grooves give the appearance of vertical board construction. Panelgroove is to be available soon



in 4-by-8 ft panels or any combination of lengths that can be cut from a 16 ft panel. It has a shiplap joint treatment. The overlap on one edge is ¾ in. and the underlap on the opposite edge is 1⅛ in.—the shiplap edge treatment, therefore, also forms the groove at the joint. For greater strength at the joints, the groove formed by the shiplap will be ⅛ in. deep, company explains, and because of the joint treatment, each panel actually will be 48¾ in. wide to cover a full 48 in. of wall. The panels may be nailed to studs or over sheathing. Masonite Corp.

2—POLYETHYLENE RESIN with increased rigidity

Experimental quantities of a new type polyethylene resin with greater rigidity and higher temperature resistance are expected to be available for use in the near future. The new material is produced under conditions that approximate atmospheric pressure and temperature—instead of the high pressures and temperatures normally used—and softening points up to 240 F are indicated. Bakelite Co., Union Carbide and Carbon Corp.

3—CEMENT BASE PAINT to prevent water seepage

The problem of wet basements or seeping elevator pits can be controlled with Waterfoil, announces manufacturer of this ready-mixed cement base paint designed to prevent water seepage. Waterfoil may be applied to a wet or dry wall without need to saturate the surface with water before and after application, it is noted; and the addition of self-hydrating agents, known as KB-55, renders Waterfoil self-curing. Company explains that through chemical interaction, KB expands within surface voids into a cementitious coating that cures into a stone-like water barrier which permits breathing of the underlying masonry which does not allow the passage of water.

Waterfoil is claimed to withstand hydrostatic pressure of 500 lb per square foot. It can be applied by brush, dries in 8 to 10 hr. Two coats are recommended. Described as non-toxic and competitvely priced, this paint comes in white, gray, green, rose and buff. A. C. Horn Div., Sun Chemical Corp.

4—FEED PUMP features improved design

Introducing an improved design of controlled-capacity proportioning pumps, the Phila-Feeder pump for general water treating requirements emphasizes simplicity, durability, dependability and ease of maintenance—for economy in both first cost and upkeep. The pumps are made in simplex and duplex types for feeding from 2 cc to 18.6 GPH with maximum discharge pressures to 800 psi. Other features include: packing gland with external adjustment for positive packing compression; steel cross head running in bronze guide; forged or stainless steel piston and valve balls. Philadelphia Pump and Machinery Co.

5—RETRACTABLE WALLS keep the noise within bounds

TransWall is announced as a lightweight, retractable sound barrier curtain. It is made of a flame-resistant and sound-reflecting material, Bemisorb, a specially treated and coated burlap. Designed to reduce critical noise level at its source and yet permit free movement of equipment, supplies and material, these walls can be installed anywhere in the plant to isolate machine and production noise, and in areas that are potential fire hazards.

Actually a high density folding curtain, TransWall serves as a sound-reduction

wall that can be quickly installed at low initial cost and used to sub-divide an area into any number of independent units. TransWall Curtains consist of 7 in. panel folds, chain-spaced to prevent complete extension, and supported by steel top plates that operate on nylon wheels in an enclosed track. They are available in several colors. Bemis Bro. Bag Co.

It's easy to obtain product data with the postage-free Reader Service Cards provided on pages 213-214. Use them for information on advertised products, too. Just circle the key number appearing at bottom of the ad.

6—INDUSTRIAL TRUCK travels along without operator

The Guide-O-Matic, a recent electronic development is announced as a completely automatic truck. Neither operator nor physical connection is required for its operation—it follows a road set by a guide wire strung from the ceiling, or laid in a floor slot. According to manufacturer, the Guide-O-Matic, moves in a

steady path to its destination, at desired speed, under automatic control.

Radio waves that control the truck are transmitted over the wires by signal boxes installed throughout the plant. To call a truck, you press a button and the truck comes rolling to the station from which the signal originated. A "sniffer" box mounted on the truck, or tractor, picks up waves from the guide wire overhead. This box contains an electronic brain that answers the command, causing the tractor train to follow the route set by the guide wire. Barrett-Cravens Co.

7—ACETYLENE TORCH is light, multi-purpose unit

This new acetylene torch is announced as well balanced and light in weight to eliminate operator fatigue. The heads run cool enough to be handled immediately after operation, it is pointed out, which facilitates quick-changing. Although specifically designed to cope with increased use of silver soldering in plumbing applications, the new torch is declared fast enough for refrigeration work. It also provides the "pencil flame" for electrical work and has copper heads suited for

CRANE VALVES have longest life in this sulphur pit

THE CASE HISTORY— Leakage in steam lines to sulphur pit heating coils was hindering operations at International Minerals & Chemical Corp. plant at Lockland, Ohio. The condition prevented servicing of traps, strainers and the heating coils.

Valves that leaked beyond repair after as little as 6 months' service were the source of the trouble. Their seating as well as packing failed to stand up.

In January, 1953, after trying other types, Crane 14½P Plug Type Disc Globe Valves were installed. Today, they're still giving excellent service at low cost. Recently, the steam piping was completely replaced—the Crane valves were repacked and put back in the lines. That's all the maintenance they needed after 18 months in this severe service.

Crane 150-Pound No. 14½P Plug Type Disc Brass Valves

Long-wearing, hard seating surfaces in a rugged, well-proportioned, Crane-designed body make these valves exceptionally suited for steam and other severe services. Consult your Crane Catalog or your Crane Representative.

CRANE CO.

General Offices: 836 S. Michigan Ave., Chicago 5, Illinois
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VALVES • FITTINGS • PIPE • PLUMBING • HEATING

CRANE'S FIRST CENTURY . . . 1855-1955

For more facts circle 574 on Reply Card

NEW PRODUCTS

(Begins on page 134)

sheet metal jobs. The complete outfit includes two handle assemblies and seven head styles. The regulator is solid brass. Also available with the outfit is a Bunsen burner which will work on the torch handle or separately as a complete unit with its own valve. Ransome Co.

8—CONTROL PANEL is rain tight, for outdoor use

This panel for outdoor service is designed for reliable motor control under a variety of climatic conditions. Combining company's Life-Linestarter with either an AB circuit breaker or a fused De-ion visible-blade switch within a rain-tight cabinet, the panel is declared capable of accurate overload and short circuit protection.

The rain-tight cabinet is made of Bonderized steel for protection against rust or corrosion. A continuous Neoprene sponge gasket is used to assure a rain-tight seal when cover is closed and its luggage type latches are fastened. Mounting brackets at top and bottom are suitable for pole or wall mounting and space is provided within the enclosure for mounting timers, relays and other auxiliaries. Built-in oil-tight pushbutton assemblies are proof against rain damage, it is noted, and when equipped with rubber caps, are unaffected by ice accumulations. The panel is available for 220- or 440-v application in NEMA sizes 1 through 4, and it comes in ratings to 100 hp. Westinghouse Electric Corp.

9—MOISTURE DETECTOR for refrigeration systems

Designed to perform the dual job of indicating when moisture is present in a refrigeration system and then removing it, the Dry-Eye System lets refrigeration maintenance men see and analyze at a

glance the approximate moisture content of the refrigerant without shutting down the system. The window of the unit contains an indicating element which changes color depending on the moisture content of the refrigerant. When the window shows blue, the refrigerant equipment is dry; when it's pink, then moisture is present. The new device is expected to have far-reaching implications because acid and sludge—two frequent causes of refrigeration system breakdown—frequently result from the presence of moisture. Ansul Chemical Co.

10—STEEL CLIP resists condenser tube erosion

Designed to protect condenser tubes from erosion, this stainless steel clip is made from 26-gage metal with slightly flaring sides for tension. It is attached directly to the condenser tube. The clips are available in 2 ft lengths for ¾, ⅞ and 1- in. diam condenser tubes. Use of the clips does not appreciably affect heat transfer rate of the condenser tube, manufacturer states. While the clip does not repair an eroded tube, it resists further erosion and in many cases it may not be necessary to replace the clip-protected tube for a considerable period of time. Occasional inspection of condenser tubes for signs of erosion will determine whether protector clips should be applied. Allis-Chalmers Mfg. Co.

11—FLOOR PATCH with dry tamping feature

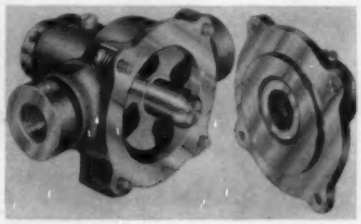
Permamix is described as a dry tamp, instant setting floor patching material. There's nothing to add or mix; it dry pours, and is ready for use as it comes from the container. It won't freeze, can be stored indefinitely and used in any temperature, says company, and because it sets instantly, traffic can be resumed immediately. Ease of application is a major advantage of Permamix. You simply clean the hole to be patched and spread the primer supplied in the drum; then fill in with Permamix and tamp solidly. The material comes in 50-lb fibre drums. Permamix Corp.

12—MASTIC, fire retardant, for chilled insulation

A solution to the problem of fire safety in vapor-barrier mastic coatings is announced in Fire-Retardant Mastic 60-60. This new non-asphalt mastic is reported listed by Underwriters' Laboratories as contributing virtually no fuel, when dried, to fires that may break out near mastic-coated tanks, pipes or equipment. Applied by spray or trowel, this mastic is claimed to possess an extraordinary vapor-barrier property for application over insulation on refrigerated pipes or vessels—moisture vapors, pressing inward towards the chilled equipment are sealed out by the low permeance of the mastic. By keeping out these vapors, the new mastic preserves both insulation and insulated surface from the formation of ice and condensed moisture, company explains, and thermal conductivity of the insulation material is thus kept low through the elimination of water as a heat conductor, and the metal surface of the refrigerated vessel is protected from corrosion. This mastic is also said to be uncommonly flexible and resistant to a wide range of weather conditions and to attack by severe chemical atmospheres. Benjamin Foster Co.

13—VARIABLE CAVITY PUMP maintains constant flow

Maintaining a constant volume of flow despite fluctuations in city water pressure is the function of this variable cavity pump. When the pressure in the pump reaches a predetermined point, a spring-loaded end plate moves outward, increasing the length of the pump cavity and



enlarging the clearances between the ends of the rotor and the end plate. Increased clearance in the pump lets the liquid recirculate, reducing the pump's maximum pressure. Pressures can be varied from 3 or 4 lb up to 75 lb, manufacturer states, and when they drop the end plate is automatically forced in by springs to reduce clearances.

Pump parts are available with ⅜-in. internal pipe thread or external garden hose thread. The hollow shaft pump will slip directly onto a ½-in. motor shaft. Maximum expansion of the pump cavity at 75 lb pressure is 0.005 in.—at 30 lb, 0.015 in. The end plate serves as a relief valve; it operates like a piston. Hypro Engineering, Inc.

14—PIPE FITTINGS in plastic, for industrial use

Now available is polyethylene plastic pipe in ½- to 2-in. sizes, and modified polystyrene insert fittings—ells, tees, couplings and adapters. The pipe is available in standard coil lengths as follows: ½ and ¾ in. in 400-ft coils; 1 and 1¼ in., 300-ft coils; 1½ in., 250-ft coils; 2-in. in 200-ft coils. It is also available in 100-ft coils in sizes up to 2 in. Crane Co.

15—TIME DELAY RELAY has high speed contacts

The Type A Silic-O-Netic Relay is available with standard timings from ¼ to 120 sec. Variable flux operation, caused by changing relationship of a solenoid coil and its core, produces highly definitive contact action, it is pointed out. In this design magneto-motive force has been increased and this factor combined with spring loading of the armature is said to achieve high speed contact action with substantial pressure for reducing contact resistance. The new relay utilizes

New BETTER way to insulate plant piping

gb SNAP*ON

Less than two years ago it was a time-consuming and expensive job to insulate plant piping. Not so today, thanks to a new concept in pipe insulation — G-B Snap*On, the new one-piece molded pipe insulation of fine glass fibers.

Snap*On goes on piping far quicker and easier than any other pipe covering, with less down-time or interruption of plant processes. It comes in 6' sections that can be snapped over piping in a matter of seconds. It's exceptionally light in weight, easy to apply even in tight spots. No time is wasted in clean-up, since Snap*On is clean and dustfree, won't crumble when dry or get muddy when wet.

All this adds up to quicker, easier application than you've ever experienced. So don't fail to try Snap*On the very next time you need insulation from chilled or heated piping where temperatures do not exceed 350°. You'll find there's absolutely *nothing* like it for *economical application, thermal efficiency* and *permanence.*

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write today or call the G-B Distributor in any of 57 cities. You'll find him listed in the Yellow Pages under "Gustin-Bacon Insulations."

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Thermal and acoustical glass fiber insulations • Pipe Coverings and fittings • Railroad gaskets and supplies

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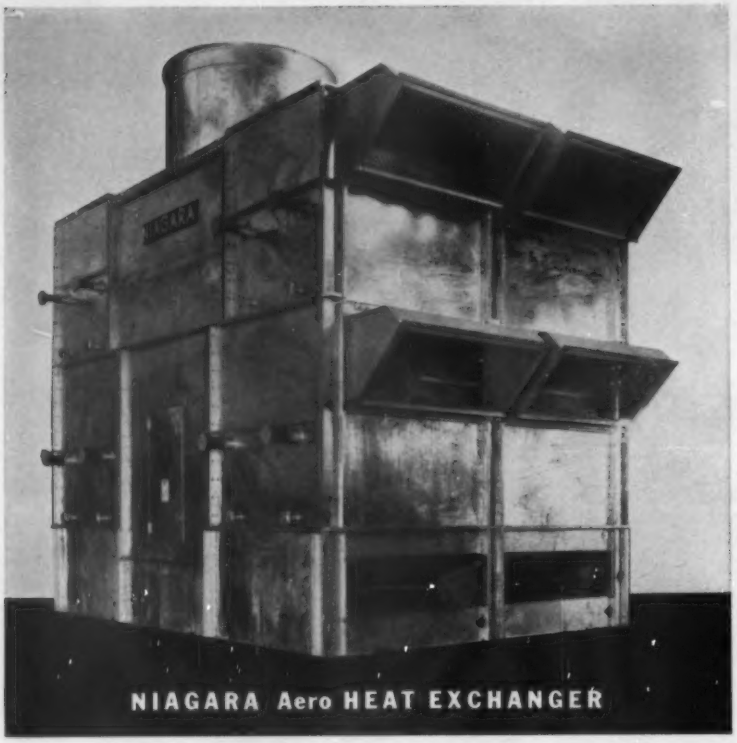


Thirty Million B.T.U. CAPACITY

with Precise Control of Temperature in Cooling

The NIAGARA Aero HEAT EXCHANGER cools liquids and gases by evaporative cooling with atmospheric air, removing the heat at the rate of input, controlling temperature precisely. You save 95% of cost of cooling water; you make great savings in pumping, piping, power; quickly recover your installation cost.

You can cool and hold accurately the temperature of all fluids, air and gases, water, oils, solutions, chemical intermediates, coolants for mechanical, electrical and thermal processes. You obtain closed system cooling free from dirt. You solve all the problems of water availability, quality or temperature.

In CHEMICAL PROCESSES this is successfully used in cooling liquids and gases, chemical reactions, condensing distillations and reflux cooling.

Write for complete information; ask for Bulletins 120 and 124. Address Dept. PE.

NIAGARA BLOWER COMPANY

405 Lexington Ave. New York 17, N. Y.

District Engineers in Principal Cities of United States and Canada

For more facts circle 576 on Reply Card

NEW PRODUCTS

(Begins on page 134)

company's hydraulic-magnetic principle, in which a silicone fluid is the basis of time delay. It is furnished with coil ratings from 24 to 240 v, a-c; 6 to 125 v, d-c. Bulletin T-5002 gives complete information. Heinemann Electric Co.

16—MASTIC COATING needs only one spray coat

Amercoat 87 can be applied at a thickness of 10 mils in one double-pass spray coat, company reports, and the vinyl mastic produces its heavy film thickness without sacrificing the chemical and moisture resistance for which vinyls are known. Despite its high solids content, the coating is applied with conventional industrial spray equipment. The dense, highly impermeable protective film does not flow away from the edges and sharp corners, it is pointed out, and therefore provides extra protection for areas particularly susceptible to corrosive attack. These new properties are attributed to an increased vinyl resin content made possible by new combinations of solvents. Manufacturer says the coating has a non-volatile content in excess of 55 per cent—nearly twice that of many vinyl maintenance coatings. Amercoat Corp.

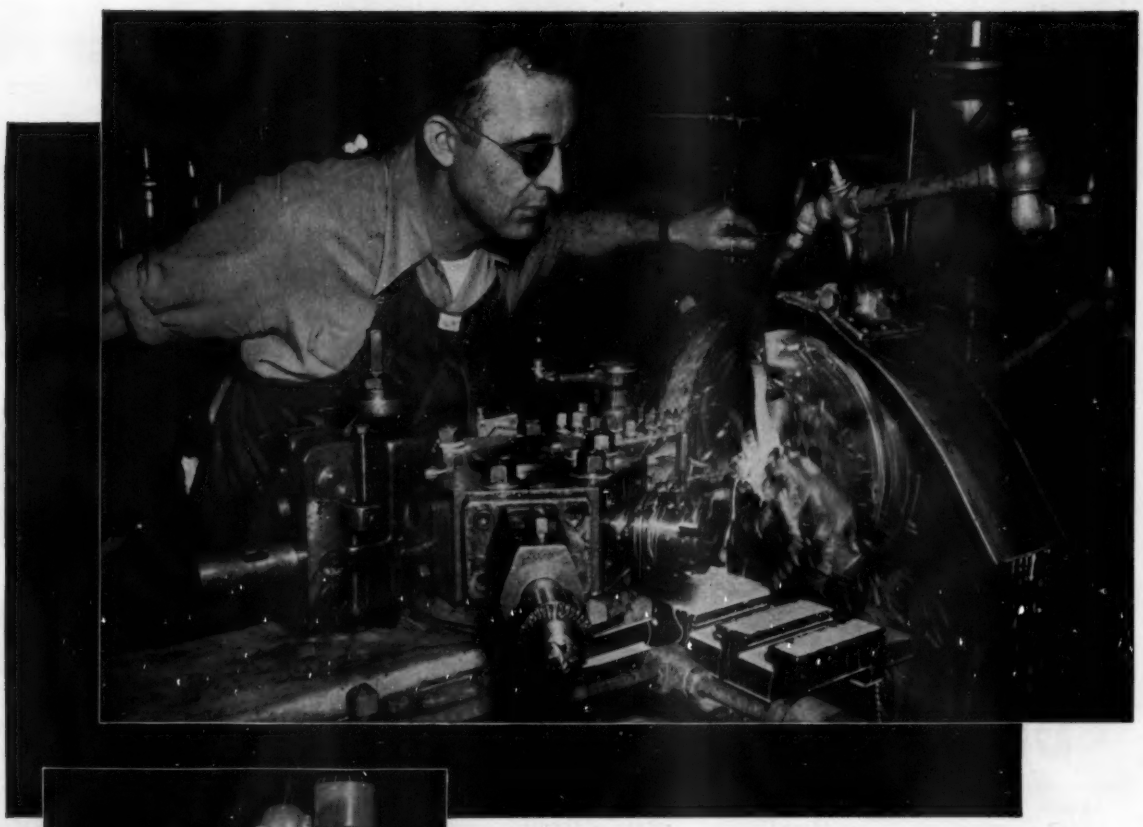
One of these products may be "just what you're looking for." Use the handy Reader Service Cards to ask for more information on it.

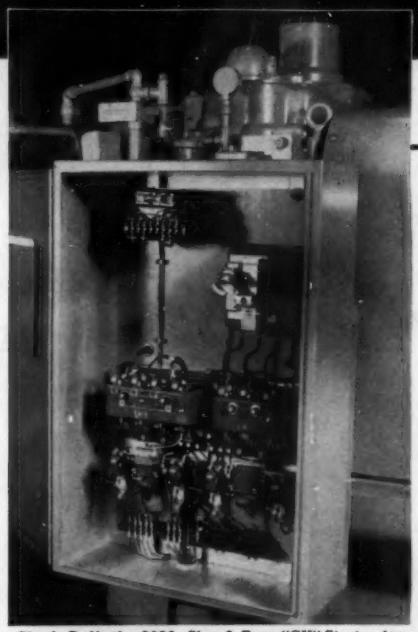
17—WATER HOSE is more visible underground

Golden Vim water hose, designed primarily for underground water service, is made with a bright yellow cover to make the hose more visible during underground water service. This, company points out, helps eliminate hazards to workmen, as well as accidental damage to the hose itself. The tube is especially compounded for resistance to water absorption, while the cover is designed to withstand severe service conditions. Although constructed especially for mining service, its flexibility and strength make it applicable to other industries as well. It is available in both ¾ in. and 1 in. ID sizes. Boston Woven Hose & Rubber Co.

18—PROPORTIONING PUMP, choice of plastic ends

Designed to meet the need for a proportioning pump capable of handling highly corrosive fluids, this company's "U" type pump is now offered with two types of plastic liquid ends. Pump body and check valve assemblies are unplasticized, polyvinyl chloride or Kel-F. Used in conjunction with ceramic pump plungers and ceramic check valve balls, these plastics





Clark Bulletin 6050, Size 2 Type "CY" Starter for Single Winding 2 Speed Constant Torque A.C. Motor used on Warner & Swasey Universal Turret Lathes.

→ CLARK CONTROLS help Warner & Swasey lathes

"machine better, faster, for less"

● Selected for long, trouble-free performance, Clark Bulletin 6050 Size 2, Type "CY" 2-speed starters are used on Warner & Swasey's No. 5 Universal Turret Lathes. Maintenance and wear on contact tips are reduced to a minimum as a result of an exclusive arc quenching method employed on Type "CY" starters. Effective arc interruption and reduced wear on tips is accomplished by using strong multi-turn magnetic blowouts and double-break contacts. Forced rotation continuously moves the arc from a hot to a cold spot, distributing the heat evenly over entire contact, preventing pitting or "build-up." Tips require no cleaning or dressing over long years of maintenance-free operation.

Write for complete descriptive literature.

The **CLARK CONTROLLER** *Company*

Engineered Electrical Control

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For more facts circle 577 on Reply Card

50 Years have changed a lot of things!

...including DUST CONTROL

To merely say, "Times Have Changed," regarding the stereoscope of Granddad's day and the TV of today would surely be an understatement. *Times Have Changed* . . . so have industry's methods.

Dust control methods have changed drastically during the past few years and we have played our part in changing them with a new concept, a new design in dust filtering. The DAY High Pressure, Reverse Jet Dust Filter manufactured under DAY and Hersey patents is a real departure from "yesterday's" type filter. The DAY advanced type Dust Filter is progress for industry. It saves valuable plant space because it requires a smaller unit to handle more dust laden air. It saves valuable time because it is pre-assembled at the factory and installation time is cut to a minimum. New facts about modern dust filtering are fully disclosed in a folder which is free to you. Write toDAY for Bulletin 528R.

DAY SINCE 1881

THE DAY "AC" FILTER, using high pressure, reverse jet cleaning was introduced in 1949. This reverse jet multiple small tube filter brought to industry such advanced features as—square-to-round streamlined dust laden air inlets and multiple screw conveyor discharges. In 1954 DAY introduced the most important feature of reverse jet filters, the DAY Self-Adjusting Cleaning Ring. This cleaning ring makes better contact with the unstable filter medium to provide maximum cleaning efficiency with minimum filter wear. No other blow ring can clean filter tubes as effectively as the DAY Self-Adjusting Cleaning Ring.

DAY High Pressure Reverse Jet Filtering has been used by leading companies for 5 years. 87% of DAY Filter users have ordered additional DAY Filters. The DAY organization is nation wide and ready to serve you and counsel you on any dust problem. **Write for our Bulletin 528R.**

Cutaway view of the DAY Dust Filter—available housed or unhoused—for use on either vacuum or pressure. (Licensed by H. J. Hersey, Jr.)

The DAY *Company*

807 Third Ave. N. E. • Minneapolis, Minnesota
IN CANADA: P.O. Box 70G, Ft. William, Ontario
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Representatives in Principal Cities

STOP AIR POLLUTION with DAY DUST CONTROL

For more facts circle 578 on Reply Card

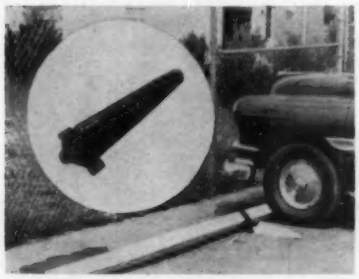
(Begins on page 134)

offer excellent resistance to such fluids as ferric chloride, sodium hypochlorite, cupric chloride, and hydrochloric and nitric acids.

The pumps have capacities to 19 gph per feed and are available in one-, two-, three- or four-feed units. Pumps with plunger diameters from ¼ to ½ in. may be used to develop pressures to 300 psi; ⅝ to 1 in. plunger diameters, for pressures to 150 psi. Maximum temperature at which PVC pumps can be used is 150 F. Kel-F pumps may be used at temperatures to 250 F. Plastic liquid end assemblies and check valves are also available to convert existing metal "U" pumps to plastic construction, and are interchangeable with the metallic liquid ends. Hills-McCanna Co.

19—SPACE MARKERS for cars in parking areas

Har-Bar Space Markers are cast aluminum, finished in traffic yellow and are 17-in. long, 3 in. wide, and 3½ in. high.



Manufacturer says they are simple to install and maintain, can be used on new installations or added to existing barriers. Harris-Barrier, Inc.

20—DIELECTRIC HEATER generates heat quickly

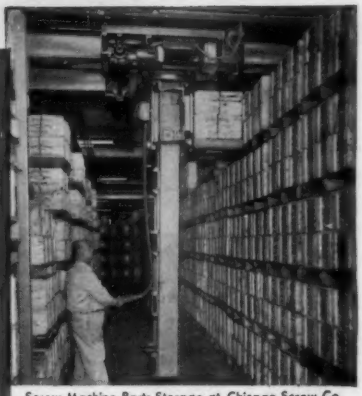
This unit uses radio-frequency energy to heat non-metallic materials such as plastics, wood, paper, foods, and chemicals. Designed primarily for research, development and small plant use, the dielectric heater creates heat by molecular friction in the mass of the material being worked. In this way plastics may be preheated and cured, bonding experiments with glues and cements can be made in a minimum of time, and seeds and foods may be irradiated and sealed. The compact unit is also useful in predetermining large scale use of dielectric heat. A timer and milliameter assure reproducible results, it is noted. Curtiss-Wright Corp.

21—RESIN COATING protects many surfaces

Thick-Coat is announced as a product which provides a durable protective coating for new or corroded metal, concrete and wood equipment and structures or surfaces exposed to fumes, corrosive

CHICAGO TRAMRAIL **TRAK-RAK** STORAGE SYSTEMS

Palletized Materials Storage at Oneida Limited



Screw Machine Parts Storage at Chicago Screw Co.

Bar Stock

Palletized Materials

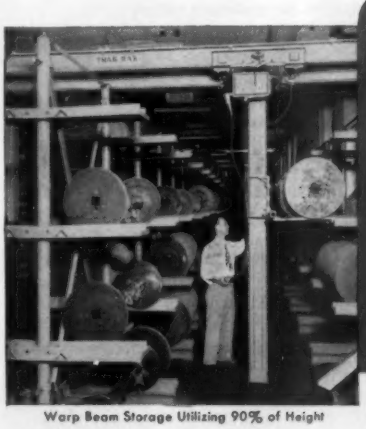
Skid Boxes

Warp Beams

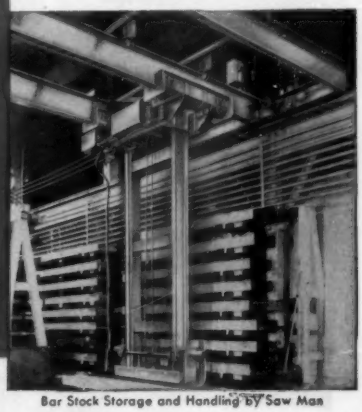
AND MANY OTHER MATERIALS

now handled and stored in many leading industrial and manufacturing plants by TRAK-RAK Systems

- to use narrow aisles and maximum stacking height to increase present storage space by as much as 90 per cent
- to reduce handling costs and manpower
- to provide 100 per cent selectivity in storage and removal.



Warp Beam Storage Utilizing 90% of Height



Bar Stock Storage and Handling by Saw Man

What's YOUR problem?

Do you need more storage space? TRAK-RAK saved one firm from building an additional $60,000 warehouse. Is handling time-consuming and costly? TRAK-RAK cut a 2½ hr. handling time to 30 minutes and a four-man team to two men. In another installation TRAK-RAK saved many man hours due to the simplicity and maneuverability of this one-man pendant push-button control system and the selectivity in placing materials in and out of the storage area.

Write for TRAK-RAK Applications—A 20-page illustrated booklet explaining the TRAK-RAK Handling and Storage System; illustrates and describes installations in fourteen widely different industries. Ask for Bulletin TRC-101.

CHICAGO TRAMRAIL CORPORATION

1330 So. Kostner Avenue • Chicago 23, Illinois

For more facts circle 579 on Reply Card

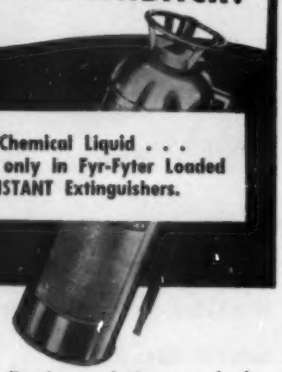
Fyr-Fyter's KARBALOY*

...PUTS OUT MORE FIRE FASTER with LESS LIQUID and PREVENTS FLASHBACK!

HERE'S PROOF! ROARING TEST FIRE OUT... in 11 SECONDS!

This raging inferno, with flames shooting 20 feet in the air, is an Underwriters' test fire in a 100 square feet pine panel.

When fire is highest, INSTANT'S KARBALOY LOADED STREAM is aimed at fire. The roaring blaze was killed in record time . . . 11 short seconds!



*Exclusive Chemical Liquid . . . available only in Fyr-Fyter Loaded Stream INSTANT Extinguishers.

This test fire is conclusive proof of Instant superiority! Karbaloy, the extinguishing liquid developed by engineers now prominent in atomic research, killed the fire in one-third time required by ordinary extinguishers . . . and only two quarts of liquid was used! Karbaloy also fireproofs as it extinguishes . . . preventing flashback or fires in rubber and other combustible materials that start up again *after* being put out by ordinary chemicals.

Fyr-Fyter Instants are designed to stop the *most prevalent fires* in wood, rubber, fabrics and other general combustibles. They require no recharging, except after use, and need no protection from freezing. The long-range Loaded Stream can be discharged at a *safe* distance of 45 to 60 feet to fight flames that cannot be approached at close range. No other extinguisher provides the combination of advantages found in Fyr-Fyter Instant Extinguishers!

Write for details today!

TEAR OUT THIS COUPON AND MAIL WITH YOUR LETTERHEAD

☐ Send full details on Fyr-Fyter Instant Extinguisher.

☐ Send a Fyr-Fyter Representative. Let's talk it over. No obligation.

DEPT. 50 FF-3

The Fyr-Fyter (FIRE) (FIGHTER) Co.

221 CRANE STREET, DAYTON 1, OHIO

REPRESENTATIVES IN PRINCIPAL CITIES

BRANCH OFFICES: *New York, Boston, Philadelphia, Chicago, Atlanta, Dallas, San Francisco, Portland, Seattle.*

For more facts circle 580 on Reply Card

NEW PRODUCTS

(Begins on page 134)

chemical laden atmospheres or spillage of corrosive chemicals of acid, alkaline or neutral nature. The coating is applied like regular maintenance paint by brush, roller or spray as it comes from the can. In a three-coat system—one primer and two top coats—it will build to a minimum of 6 mils dry film thickness. Containing over 60 per cent solids by weight, Thick-Coat is reported to give long lasting protection on edges, prominences and crevices as well as on plain surfaces. Standard colors are white, green, slate gray and black. Other colors may be ordered. Pennsylvania Salt Mfg. Co.

22—SPACE HEATER is versatile, semi-portable unit

Waikiki Space Heater 4820 can be used to heat buildings under construction, garages, loading docks, sheds or to cure concrete. It heats and circulates 2500 cfm or this may be reduced to 900 cfm. The semi-portable heater has a home type oil burner or may be equipped with a natural

gas or bottled gas burner. The fuel nozzles can be changed to give 80,000 to 200,000 Btu input. A squirrel cage type blower circulates air around the three combustion chambers.

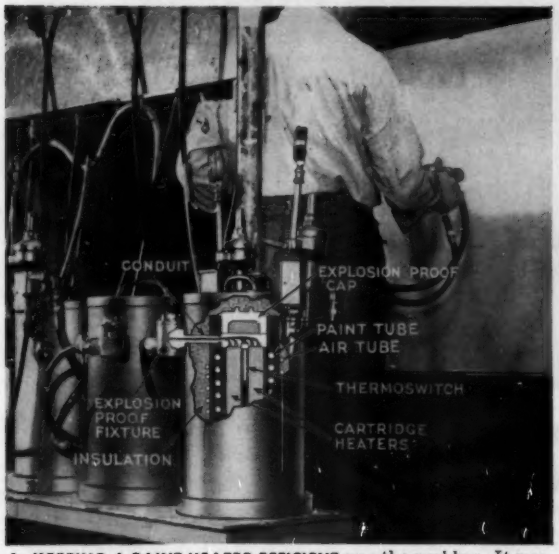
Once started, thermostats with variable settings take over, causing heater and blower to automatically cycle on and off, it is explained, and an electric spark assures proper lighting. The heater is installed by making three service connections—to a 110-v outlet, fuel to the burner, and an exhaust outlet. Enclosed in a metal cabinet, mounted on legs, the heater can be picked up and moved about or it may be suspended from the ceiling. It is 48 in. long. Vapor Heating Corp.

23—RESISTANCE METER measures insulation resistance

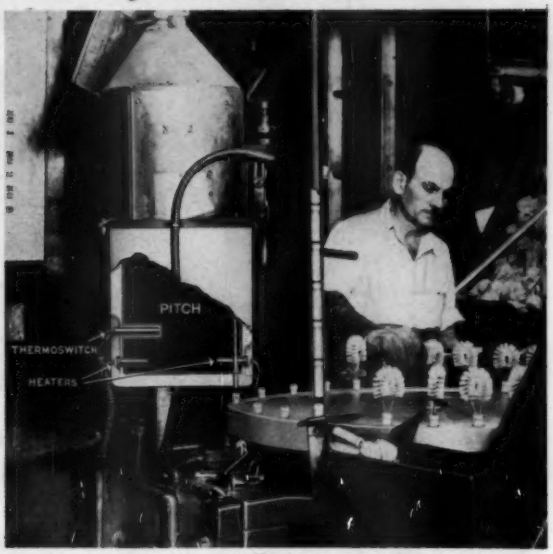
This 10 kv insulation resistance meter is designed for measuring degrees of insulation resistance, polarization index, and leakage current. It is portable and provides for making of d-c over potential tests. Said to be ideal for measuring of insulation quality of equipment such as rotating electrical machinery, windings, transformers and associated equipment with large dielectric capacities, the meter is designed to measure insulation resistance to 200,000 megohms at 10 kw.

When utilized for d-c testing, it reveals faults not observable by a-c tests, says

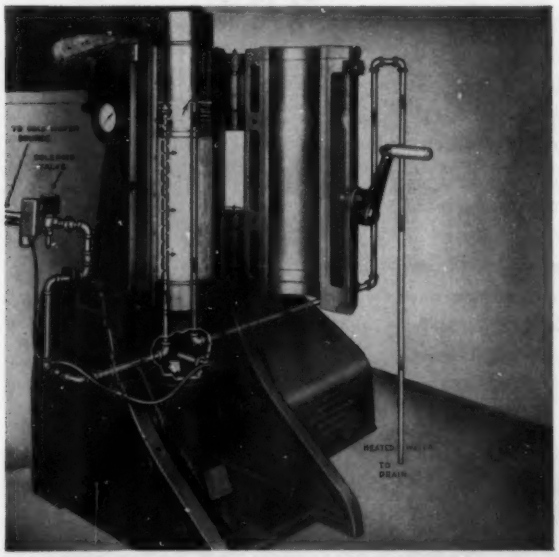
How would you solve these tricky temperature control problems?



1. KEEPING A PAINT HEATER EFFICIENT was the problem. It was solved with the help of a Fenwal heavy duty block THERMOSWITCH® unit. Heat from a 2000-watt source is accurately held at 150F—for top efficiency. Users just plug it in, forget it. THERMOSWITCH unit is attached to explosion-proof block, as shown in diagram.



2. PROTECTING MACHINERY. Engineers wanted to prevent motor damage to automatic brush assembly equipment by starting the operation shortly *before* the sealing compound (pitch) reached the liquid stage. Upon Fenwal advice an inverse type THERMOSWITCH unit was installed to close circuit when pitch temperature reaches 180F. Circuit opens *only should* pitch heaters fail.



3. COOLING PRINTING PLATES. If printing plates cool too fast, they shrink — if too slow, they become porous. Reject plates were practically eliminated when a solenoid water valve was substituted for a hand valve — with a Fenwal THERMOSWITCH unit guarding the water temperature closely and operating the valve whenever the set point was passed. THERMOSWITCH shell itself "senses" change.

4. FREE CATALOG brings you complete data on the unique THERMOSWITCH unit. More details on problems discussed here if you want them. Fenwal engineers are always glad to help on special temperature control problems involving heat, humidity, pressure and other variables. Write **Fenwal Incorporated, 354 Pleasant St., Ashland, Mass.**

Fenwal **THERMOSWITCH®**

Controls Temperature — Precisely

For more facts circle 581 on Reply Card

another NORGREN 1st in better bearing lubrication at lower cost

Automatic, centralized Micro-Fog Lubro-Control Unit lubricates up to *1000 BEARING INCHES*

Lubricates 350 bearings, 170 gears on CROSS TRANSFER-MATIC Machine in large automobile plant

The 80 ft. long Cross Transfer-Matic shown above is in the engine plant of a large automobile manufacturer. It is completely automatic, and includes an ingenious system of monitoring controls which automatically stops the machine if trouble occurs and flashes signals on a control panel showing location of trouble. It has been machining 80 V-8 engine blocks per hour on a 16-hour-day schedule for more than six months.

The new Norgren Micro-Fog Lubro-Control Unit was selected by The Cross Company for efficient, *automatic* lubrication. Two large capacity Lubro-Control Units (Model 33AB-4) lubricate 350 ball bearings and 170 spur gears in the multiple spindle heads. They operate at approximately 15 psi, use approximately 10 cfm of air, *and use only 1.6 fluid oz. of oil per hour.*

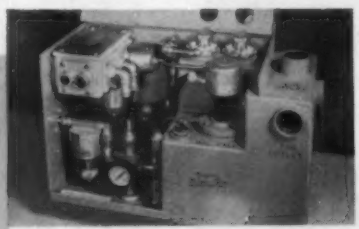
The Norgren Micro-Fog Lubro-Controls have proven advantages on many Cross Transfer and Dial type machines: completely automatic with trouble-alarm system; elimination of bearing and gear box seals, elimination of many smaller lubricators and complex piping systems; better lubrication has resulted in more efficient machine performance, reduced maintenance and lubrication cost; air-borne Micro-Fog lubrication results in lower bearing temperatures . . . bearings operate at temperature only slightly above ambient.

For complete details write for Norgren Blueprint MF-11 and Form 492A

Let Norgren experience help you on your bearing lubrication problems.

C. A. Norgren CO.
3443 So. Elati, Englewood, Colo.

Oil Fog Lubricators • Pressure Regulators
Air Filters • Valves • Hose Assemblies



New Model 33AB-4 Norgren Micro-Fog Lubro-Control Unit used on above Cross Transfer-Matic

For more facts circle 582 on Reply Card

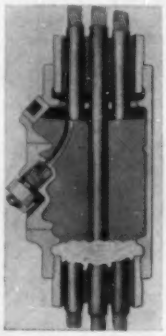
NEW PRODUCTS

(Begins on page 134)

manufacturer, and thus provides a complete picture of insulation quality. It is also suggested for production testing or laboratory checking. Featuring resistance reading directly for specified voltage, and d-c voltage output continuously adjustable over a range of 0-10,000 v d-c of either polarity, the meter is claimed to handle capacitances normally found in large, high voltage apparatus. It includes a built-in voltage stabilizer plus a high sensitivity and readability of 0.02 microamperes per scale division on a low range of 3½ in. scale. It requires a power supply of 115 v ± 10 v, 60 cycles a-c, fused for a 20 amp start. It weighs 110 lb. General Electric Co.

24—CONDUIT FITTINGS for use in hazardous areas

By sealing vertical runs of conduits, this explosion-proof drain sealing conduit fitting, the Type EYD, guards against insulation failure by water accumulation. Similar in function to company's Type EZD Sealing Condulets, but without the removable inspection cover, the fitting is more economical to use and available in larger hub sizes. Hubs range from ½ to 6 in. in two styles: the smallest sizes have one opening for damming and filling, and those of 1¼ in. and larger have separate damming and filling openings. To drain water continuously, this sealing conduit fitting is equipped with an ECD drain.



It is noted that since a length of rubber tubing and solid copper wire are furnished with each conduit fitting, damming and filling the seal interior are done more simply. The tubing, with the wire inside, is inserted up through the drain opening into the sealing chamber. Sealing compound is poured in, enclosing all but the top of the tubing. After the compound is hardened, the wire and flexible rubber core are removed, leaving a drain path from the seal's upper surface to the ECD drain. Crouse-Hinds Co.

25—PRINTING DEVICE identifies recording charts

The Identichart is a compact device designed to automatically print a number, date or time on Brown strip charts and similar recorder charts at any instant when a voltage is applied to the device during process, test and control work. It makes it easy to identify individual sections of recording charts in relation to particular conditions taking place at a remote point. The unit mounts on the

One undivided responsibility

to solve your DUST and FUME CONTROL PROBLEMS

Dust control system showing grinding hoods at Crescent Tool Co., Jamestown, N. Y.

For 48 years, Kirk & Blum has specialized in the DESIGN, FABRICATION and INSTALLATION of efficient, dependable systems for the removal of dust and fumes.

DESIGN: Kirk & Blum engineering specialists survey your plant and then design your system, selecting equipment most suitable for your problem.

CONSTRUCTION: Kirk & Blum fabricates the complete system (equipment excepted), "tailor made" for your installation.

INSTALLATION: The Kirk & Blum contract includes responsibility for the entire system, installed by mechanics with years of specialized experience in the installation of such systems.

Fume Exhaust System in plating room at S. E. Overton Co., South Haven, Mich.

As a result, you have one undivided responsibility
—one complete contract for an installed system, ready to operate.

The Kirk & Blum Mfg. Co., 3189 Forrer Street
Cincinnati 9, Ohio

WRITE FOR ANY OF THE FOLLOWING BOOKLETS:
"Dust Collecting Systems in Metal Industries"
"Blower Systems for Woodworking Plants"
"Fan Systems for Various Industries"
"Industrial Ovens"

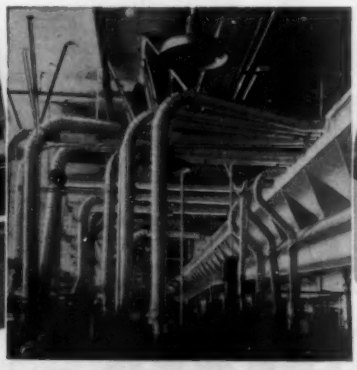
Down Draft Dust Control System for Grinding and Snagging in machine tool shop.

FOR CLEAN AIR . . . THE INVISIBLE TOOL

KIRK AND BLUM

DUST & FUME CONTROL SYSTEMS

A Dust Control System installed in large woodworking plant.



Plenum Type Dust Control System for production woodworking plant.

Dust and Fume Control in modern foundry of famous implement manufacturer.

For more facts circle 583 on Reply Card

Put P&H to work in your yard!

Start Cutting Costs NOW with Modern Truck and Crawler Cranes!

Whether it's bulk materials or complete assemblies — whatever size your loads may be — P&H offers the right machine from the world's most complete line of Power Cranes.

These modern features mean money in your pocket: welded steel construction — smooth hydraulic control for accurate handling — smooth travel — easy maneuvering. And above all, here's the famous P&H stability that lets you put "more on the hook."

P&H, world's largest builder of "thru-the-air" materials-handling equipment, is ready to advise you on the most modern, low-cost methods of handling materials around your plant — inside or out. See your P&H Power Crane and Shovel dealer or write for literature. P&H Power Crane and Shovel Division, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

HARNISCHFEGER

For more facts circle 584 on Reply Card

NEW PRODUCTS

(Begins on page 134)

outside of the door of the recorder and, company says, it does not interfere with or obscure the recording procedure. It is made for 28 v d-c operation but can be adapted to other electrical requirements.

For easy installation, the Identichart is supplied in kit form. The kit consists of a strip of rubber for the chart platten, mounting screws, Plexiglas window to replace the original one in the door, plastic transparent cover for the device itself and instructions for installing. Wires on the unit go to the power supply and switch which is connected to the process. Royson Engineering.

Use the Reader Service Cards provided on pages 213-214 to ask for more information on these products. Circle item number of products in which you are interested.

26—ENCLOSED MOTOR is compact, well protected

Announced for applications requiring a completely enclosed unit, the Type J Motor conforms to recent NEMA dimensional standards and is more compact than company's previous models. Besides providing the same horsepower in less space, it is said to feature higher electrical characteristics and closer tolerances, also greater protection. And no general disassembly is required for access to bearings.

The Type J is engineered for operation where fumes, dusts and moisture are prevalent; its externally exposed surfaces are cast iron for corrosion resistance. Among other features of this motor are a solid cast frame structure, ribbed around the entire unit for strength and rapid heat dissipation; pre-wound stator core; and asbestos protected windings. The ventilating fan is housed in a cast iron guard. The Type J is being produced in ratings from 1 to 10 hp—may also be had in a fanless type for lower ratings from 1 to 1½ hp. Bulletin 1879 gives details. U. S. Electrical Motors, Inc.

27—PLUG-IN CONTROLLER has three-position control

This millivoltmeter plug-in controller housed in a horizontal case is available with three different control forms—on-off, two-position, and three-position. The three-position control form incorporates a dual index scale and provides a neutral zone adjustable from 0 to 100 per cent of full scale (wide zone model) or 0 to 10 per cent of full scale (narrow zone model). The calibrated accuracy of the instrument is given as ± ¾ per cent of full scale. Prime advantage of the horizontal case (19 in. wide) is that it makes it practical to stack several instruments

they found $27,000 in a puddle of oil...

It was easy enough to find a puddle of oil in this New England steel plant. 700 gallons of the expensive stuff ended up on the floor every week. It was wasted in the lubrication of massive bearings on their strip rolling mill. Housekeeping problems were terrific.

Then Alemite Oil-Mist was installed on one set of bearings for a test. The results were so immediate—so impressive, that this remarkable system was installed throughout the plant. It eliminated oil waste completely! Saved the 700 gallons of oil that had ended up on the floor every week—a matter of $27,000 a year!

Even more important were the savings effected in labor costs, downtime, and the reduced possibility of bearing failure. A major housekeeping problem and fire hazard was eliminated from the plant. No wonder management is delighted. Delighted, too, with the ease of Oil-Mist installation and the modest cost, repaid by savings in a few short weeks.

Here's the unit that brings these savings to any machine! This is the heart of the Alemite Oil-Mist system. It atomizes oil into tiny, airborne particles that are distributed to bearings through tubing. These particles form a continuous, uniform film of oil that both lubricates and cools the bearing surfaces.

FREE—the complete story of Oil-Mist—how it can bring these savings to any machine in your plant. Specifications, typical installations, case histories.

Three types of fittings allow the use of Alemite Oil-Mist on any bearing—any machine!

1. Oil-Mist fittings bring the most efficient lubrication in the world to roller, ball, needle—or any anti-friction type of bearing.

2. Oil-Mist Spray fittings are recommended for open and enclosed gears and chains. Allows for concentrated application where needed.

3. Oil-Mist Condensing fittings are applied to plain bearings, slides, ways, vees, cams, and rollers. Completely condense Oil-Mist.

ALEMITE
REG. U. S. PAT. OFF.

A PRODUCT OF SW STEWART-WARNER

Ask Anyone in Industry

ALEMITE, Division of Stewart-Warner, Dept. EE-45
1850 Diversey Parkway, Chicago 14, Illinois

Gentlemen: Please send me complete information on Alemite Oil-Mist. No obligation, of course.

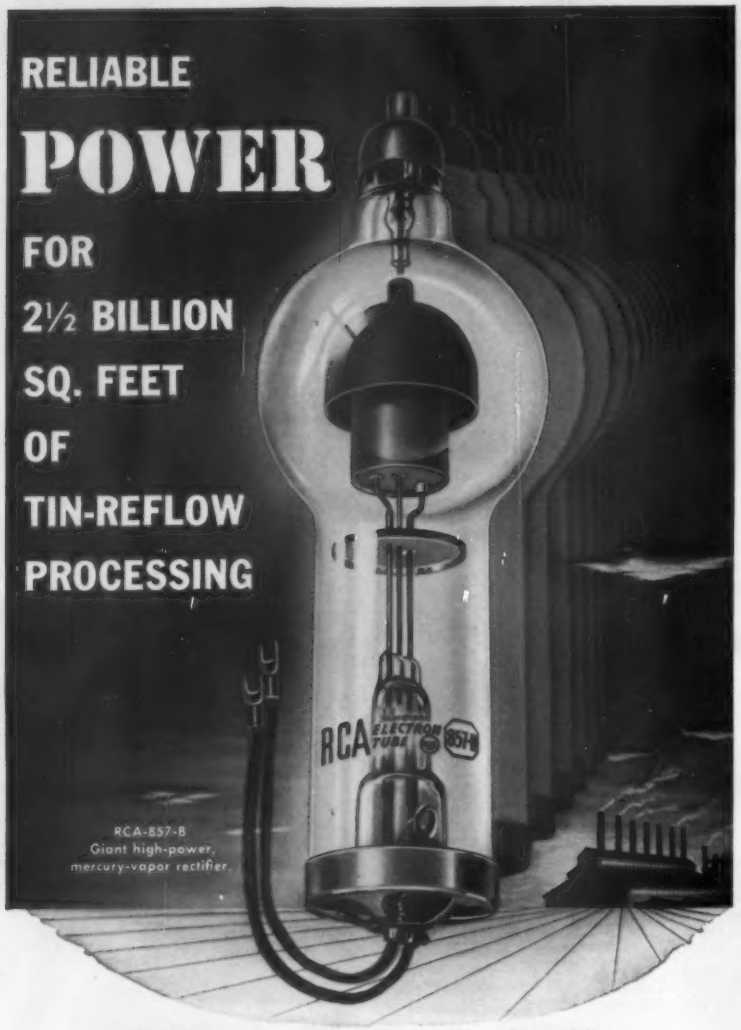
Name .....

Company .....

Address .....

City ..... Zone ..... State .....

For more facts circle 585 on Reply Card



RCA high-power rectifiers give long-life service at Weirton Steel Company—a division of National Steel Corporation

Tin reflow on steel strip, averaging 30" in width, is achieved with amazing speed, quality, and economy at Weirton Steel by means of electronic heating. Moving at the rate of 1,300 ft. or more per minute, the steel strip passes through high frequency heating coils, fed by a group of 200 kw electronic oscillators, which reflow the tin, producing a high quality coating.

To supply the oscillator plate power for this high-speed electronic operation, Weirton uses 24 RCA 857-B's in two banks of 12 tubes each. This rectifier installation has given an average tube life of 12,000 hours...a period representing about 2½ billion square feet of strip production.

Here is another example of the way RCA Tubes are helping industry do a better job at lower cost.

* * *

When you need power tubes, rectifiers, ignitrons, thyratrons, computers, phototubes, or RCA Tubes of any type, call your RCA Tube Distributor. (He's listed in the Thomas' Register.) For tube technical data, write RCA, Commercial Engineering, Section C-34-T. 415 S. Fifth Street, Harrison, N. J.

RCA **RADIO CORPORATION of AMERICA**
ELECTRON TUBES HARRISON, N.J.

For more facts circle 586 on Reply Card

NEW PRODUCTS

(Begins on page 134)

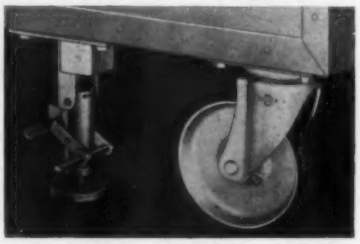
in standard relay racks. The instrument weighs 26 lb. Other design features make it possible to ship the galvanometer separately to decrease possibility of damage during transportation, and to check calibration without disconnecting wiring. Minneapolis-Honeywell Regulator Co.

28—ROTARY PUMP for heavy duty applications

Described as a "work horse" pump, the Model 300 Rotary Pump is claimed ideal for handling heavy viscous materials containing large solids or semi-solids. It is suggested for use for large capacities or where material must be handled with the least amount of agitation at low rpm's. The pump incorporates ball bearing construction in both gear case and face plate, is self priming under pressure. It will handle materials up to 550 F, is available with or without lantern rings for packing lubrication or stuffing box flushing. Bump Pump Co.

29—POSITION LOCK permits greater ground clearance

Designed for use with company's 6- and 8-in. H99 Series of industrial casters, this new retractable position lock offers 3¼-in. ground clearance when retracted, in contrast to 1 in. clearance afforded by many types. This extra height enables



the lock, when retracted, to clear floor obstacles without hindrance, suggesting its use on scaffolds, floor trucks, engine stands and similar portable equipment.

According to manufacturer, this new device locks and releases with minimum downward foot pressure on the control levers. Thick friction facing of the lock is resilient, oil-resistant Neoprene which, it is pointed out, grips the floor firmly but doesn't mar its surface. Details are given in Catalog PL-55. The Bassick Co.

30—ROOF VENTILATOR keeps costs low, efficiency high

Simplicity of design of the Vertiflow not only keeps costs low but contributes to high efficiency, company reports, by offering minimum resistance to airflow. The unit consists of a galvanized steel windband mounted over a curb base of heavy galvanized steel. Fan mount is bolted directly to the base, with the inner diameter in the base formed into a fan ring. Galvanized lids in the windband

It's Good Accounting Practice!

TO MEASURE GAS CONSUMED BY INDIVIDUAL FURNACES, KILNS, OVENS, ETC.

Good management goes hand in hand with good measurement. Good managers know that by metering individual gas furnaces, kilns, ovens, etc., they will have accurate figures upon which to base product costs. They know that metered records of gas consumption will quickly show-up combustion deficiencies that affect the quality of the end product. They know, too, that with a meter standing guard over every department and at the inlet to every set of burners, wasteful fuel practices are discouraged.

Why don't you investigate the advantages of in-plant metering? Write the nearest Rockwell district office or use the handy coupon.

ROCKWELL "800" GAS METER

A lightweight aluminum alloy case meter having a capacity of 1600 c.f.h. at the accepted 2 in. differential when measuring 0.60 specific gravity gas. One of the complete line of Rockwell gas meters ranging in capacity from 150 c.f.h. to 10,000 c.f.h.

USE THE HANDY COUPON

Other Useful Rockwell Meters

ROCKWELL FLOW INDICATING METER

Measures rates of flow. Read directly from graduated scale in c.f.h. Time and money-saving production tools for manufacturers of gas appliances to use when setting, adjusting and testing flow rates.

ROCKWELL TEST METER

Fits the need for a gas meter with a large dial to be used in test or laboratory work. Ideal for visually demonstrating the consumption of gas appliances.

YOU CAN RELY ON ROCKWELL

ROCKWELL MANUFACTURING COMPANY

PITTSBURGH 8, PA. Atlanta Boston Chicago Dallas Houston Kansas City, Mo. Los Angeles New York Philadelphia Pittsburgh San Francisco Seattle Tulsa

In Canada: Peacock Brothers Limited

102-D

ROCKWELL MANUFACTURING COMPANY
PITTSBURGH 8, PA.

Gentlemen:

I am interested in your meters for measuring gas to individual furnaces ☐. Your flow indicating meters ☐. Your test meters ☐. Please send literature ☐. Have representative call ☐.

Your Name .....

Company.....

Street.....

City.....Zone.....State.....

For more facts circle 587 on Reply Card

For more than ten years, Sorensen NOBATRONS have provided regulated, low-voltage, high-current DC in thousands of laboratory and industrial applications. Their users have chosen them for their ±0.2% regulation accuracy, their convenience of use compared with battery installations or other sources, their dependability, their easy maintenance.

Nobatron circuits usually employ only three tubes. They are easily accessible for replacement when required. The characteristics listed below are conservative and tell you why you should specify Nobatron.

Models available (numbers indicate voltage & current) E-6-5A, E-6-15A, E-6-40A, E-6-100A, E-12-5, E-12-15, E-12-50, E-28-5, E-28-10, E-28-30, E-28-70, E-28-150, E-48-15, E-125-10, E-200-5.

ELECTRICAL CHARACTERISTICS

Input	95-130 VAC, 1φ, 50-60 cycles. 120/208, 3φ, 4-wire wye for the E-28-150. The E-28-70 requires 190/260, 1φ power.
Reg. accuracy	±0.2% against line, ±0.2% against load.
Ripple	Varies to 1% RMS max. under worst conditions.
Load range	1/10 to full load.
Output range	Adjustable ±10%; down to 20% at lesser accuracy.
Recovery time	0.2 seconds on all models up to 1 KW rating, increasing to 0.5 seconds at 10 KW.

Note: "A" models output either 6 or 7 volts. ***Reg. U.S. Pat. Off.**

NOBATRON-RANGERS **Your interests may best be served by an instrument with electrical characteristics similar to the standard Nobatron, but with stepless, continuously adjustable output. If so — find out more about Sorensen's line of Nobatron-RANGERS.**

ELECTRICAL CHARACTERISTICS

Input	95-130 VAC, 1φ, 50-60 cycles for SR30 and SR100. 190-260 VAC, 1φ, 50-60 cycles for the SR2.		
Reg. accuracy	±0.25% at any voltage setting.		
Ripple	1% RMS max.		
Output: Model	SR100	SR30	SR2
VDC	5-135	5-30	100-300
Amps	1-10	3-30	1-10

TUBELESS NOBATRONS **Sorensen is aware of the advantages of tubeless circuitry, and manufactures a line of tubeless supplies, also.**

Model SR2

ELECTRICAL CHARACTERISTICS

Model	MA65	MA640	MA2850
Input, VAC, 60~	105-125, 1φ	105-125, 1φ	190-230, 3φ, 4-wire, wye
Output, VDC	6, adj. ±10%	4.5-7.7 adj.	23-32 adj.
Load range	0-5 amp.	0-40 amp.	0-50 amp.
Ripple	1% max.	1% max.	3% max.
Reg. accuracy	±1.0% for any combination of line and load.		
Recovery time	0.2 sec.	0.15 sec.	0.5 sec.

Model MA640

Catalogs available describing the complete line of Sorensen instruments. Write for free copies today.

SORENSEN

SORENSEN & CO., INC., 375 FAIRFIELD AVENUE, STAMFORD, CONNECTICUT

For more facts circle 588 on Reply Card

NEW PRODUCTS

(Begins on page 134)

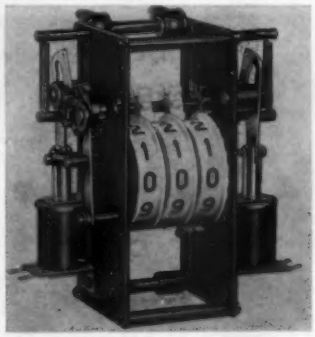
turn on plastic bearings—opening when the fan is on, closing weather-tight when it goes off. When the lids are open, the air stream effectively prevents the entrance of rain or snow. The Vertiflow is available in 18, 24, 32, 36 and 42 in. models, with capacities from 3000 to 26,400 CFM. Hartzell Propeller Fan Co.

31—PROTECTIVE FABRIC for industrial hot jobs

For use in protective garments, this aluminum-coated fabric protects the wearer by reflecting radiant heat, instead of insulating against it. The new material is described as flexible and weighing half as much as many protective fabrics—giving the wearer more freedom to work. Its base is a lightweight asbestos fabric, over which a thin aluminum coating is applied. Field tests are reported to show that this fabric lets men work in the heat for longer periods of time; molten splatter rolls off the garment instead of collecting and adding weight; and it wears longer than many protective materials. Minnesota Mining and Mfg. Co.

32—COUNTER subtracts as well as counts

Practicable for many operations, including those requiring the maintaining of a set capacity, such as controlling flow of materials to machinery or conveyors, is



this new type of counter which is designed to subtract as well as add. According to manufacturer, it will count or subtract at a rate of 400 counts per minute, up or down, in any sequence, one count per impulse, maximum 999; it can be set at a predetermined figure to shut off at zero. The counter is 6½ in. wide and high, 3½ in. deep and weighs 2 lb 5 oz. It has black letters on opaque white nylon plastic rolls. Electrical coils are intermittent duty—6 v to 110 v a-c. It can be actuated by photo electric cell, tube, relay or contact switch. Spencer Manufacturing Co.

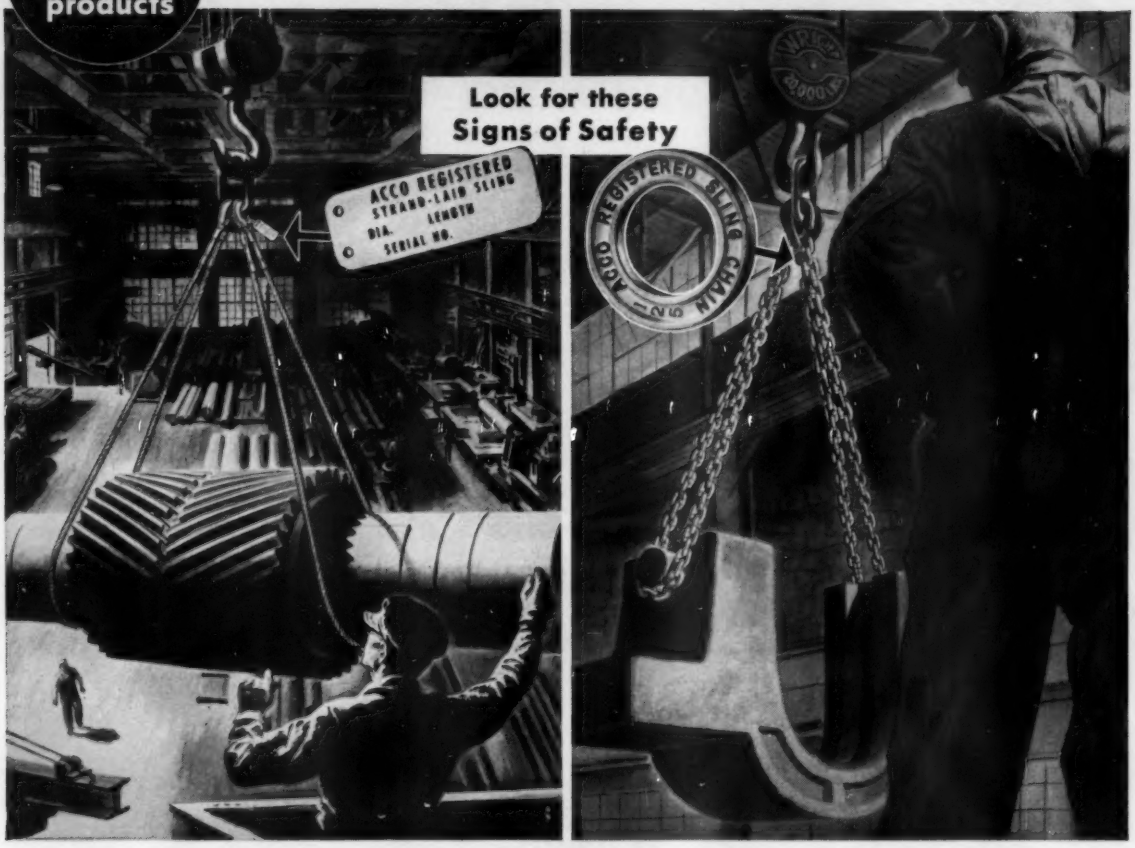
33—HYDRAULIC PUMP is two-speed hand operated

This unit has two separate pumping units which permit a variation in the operating speed of the ram, jack or other equipment

ACCO products

ACCO Registered* Slings–Wire Rope & Chain

THE STANDARD OF EFFICIENCY AND SAFETY



SAFETY WITH A SAVING

• Materials Handling is one of the most costly production operations, yet insurance of uninterrupted flow of materials is necessary for efficient and economical production. Regardless of how well production is planned, a dropped load can be very costly even without involvement of personal injury. Time is consumed, machining operations already completed can be rendered valueless, and, if a major machine tool is involved, the whole line is shut down.

ACCO *Registered** Slings are materials handling tools specifically designed to require less hook-up time and through their proved safety actually protect *against* production interruptions. All this is money saved and safety gained.

ACCO *Registered* Safety Is More Than Skin Deep

Before any item can be used in an ACCO *Registered** Sling it must prove to be the safest, most-efficient available for its particular use. Then it must prove under actual test to have strength equal to, or higher than, that developed by sling body.

For example, the special ACCO Hooks used in these slings are forged, heat-treated to insure standardized strength, proof-tested, inspected, and magnafluxed. NOTHING IS LEFT TO CHANCE.

Components which have passed these tests are then assembled into completed ACCO *Registered** Slings according to designs which have proved their safety and efficiency in rigorous field tests. Next the completed sling is individually proof-tested to twice the working load limit. Then and only then can it be tagged "ACCO *Registered*.*"

Compare the assurance given by this careful control of quality, strength, and design with the methods used in fabricating old fashioned, "home-made" slings.

*Trade Mark Registered

ACCO MAKES BOTH CHAIN AND WIRE ROPE SLINGS...

ACCO can supply both types of slings. As you know, there are places where one is preferable to the other. And there are places where a combination of both is called for. Whatever the set-up, ACCO Registered slings will fill the bill with greater safety. ACCO can advise you impartially, can furnish dependable printed information.*

Write or phone your ACCO Distributor. If you don't know him, get his name from the ACCO office in city nearest you.

ACCO

TRADE MARK

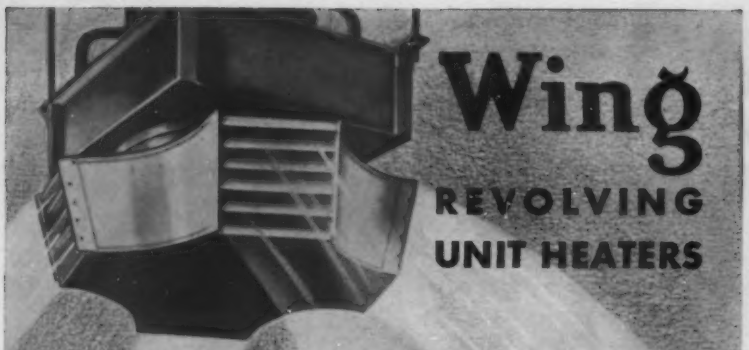
AMERICAN CHAIN & CABLE

BRIDGEPORT, CONN.

Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Wilkes-Barre, Pa., York, Pa.
In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

for Better Value

For more facts circle 589 on Reply Card



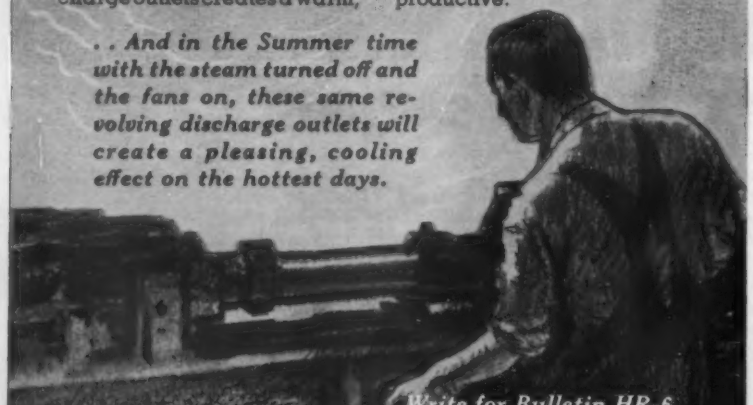
Wing
REVOLVING
UNIT HEATERS

The Moving Airstream Touches the Worker for only a few Seconds at a Time

NO SICKENING HOT BLAST!

THAT is the big difference between most unit heaters and the WING Revolving Heater. The soft airstream from the slowly revolving discharge outlets creates a warm, gentle, yet live sensation of comfortable well-being that is without equal for keeping workers contented and productive.

. . And in the Summer time with the steam turned off and the fans on, these same revolving discharge outlets will create a pleasing, cooling effect on the hottest days.



Write for Bulletin HR-6

Wing

L. J. Wing Mfg. Co.

177 Vreeland Mills Road, Linden, N. J.

Factories: Linden, N.J. & Montreal, Canada
In Europe: Etab. Wanson, Brussels, Belgium

For more facts circle 590 on Reply Card

NEW PRODUCTS

(Begins on page 134)

being activated. One piston is ¾ in. diam and delivers 3000 psi for high volume and greater speed while the other piston is ½ in. diam and delivers 10,000 psi to provide maximum power with lesser speed at the ram. By changing the pump handle either pump can be put to use. The gallon-capacity oil reservoir is of cast aluminum and is an integral part of the base.

The pumping unit may be purchased separately for mounting on specialized equipment and may be used with any capacity reservoir. This unit has three high pressure outlets and one low pressure outlet. An overload valve is built in. Any combination of piston diameters from ⅜ in. to provide 20,000 psi to ¾ in. which delivers 3000 psi are available at extra cost. Owatonna Tool Co.

34—BALANCING MACHINES are simple to operate

These heavy duty, general purpose, static and dynamic balancing machines for small and medium size rotors are reported sufficiently simple to operate to permit their use by unskilled operators in balancing motor armatures and rotors, impellers, blower wheels, flywheels, fans and pulleys. Magnitudes of unbalance are indicated by a large meter in terms of unbalance correction procedure selected. Angular positions are shown on top of rotor work-piece by a stroboscopic lamp, and are readable either as location to remove weight, or as location to add weight.

Machine operation is said to be unaffected by outside floor vibration. Work supporting carriages are cantilever mounted from machine frame bars to project rotor work-piece into operating position, and at proper height for operator. Electrical impulses from vibration pickups are multiplied and transformed into positive indications of magnitudes and positions of unbalance by means of an amplifier. All models are available in both floor and bench mounting types. Balance Engineering Co.

35—PROTECTIVE COATING for slippery surfaces

Greater safety from accidental slips and falls, and increased traction under foot or wheel are said to be assured with NSC (non-slip-coating). It is applied to most surfaces with a paint brush and no special preparation of undersurface is required. It is formulated to bond permanently with concrete, wood, metal, tile, terrazzo, or brick. Laboratory tests are reported to show that NSC gives safer, longer wear, and will extend undersurface life. Fast drying, it is available in red, green, and two shades of grey. This coating is described as water proof and cleanable with soaps, washing powders, or detergents. It is made of plastic resins and polymerized oils, with aluminum oxide granules added. The latter, it is

JERVIS B. WEBB

CONVEYOR ENGINEERING, MANUFACTURE, INSTALLATION and AUTOMATION

POWER and FREE CONVEYORS PROVIDE *Flexibility* for Assembly, Testing, Live Storage

This Webb "Power and Free" conveyor system, in the automatic transmission plant of one of the "Big Three" automobile manufacturers, is a prime example of accomplishment in efficiency, reduction of production costs and elimination of manual materials handling.

Starting in the sub-assembly area, a Webb overhead trolley conveyor carries parts to the final assembly department (shown above) where two "Power and Free" conveyors take over and carry the transmissions through every assembly operation. After assembly is completed, another "Power and Free" conveyor provides live overhead storage for the transmissions until they can be taken by conveyor to the test stand area.

In a similar manner, all fifteen "Power and Free" conveyors, located throughout the plant, are synchronized into an automatic system that is thousands of feet long. From the receiving of transmission parts, through final assembly, several live storage areas, testing, and delivery to shipping, the transmissions never leave the Webb "Power and Free" Conveyors.

With Webb "Power and Free" conveyor systems, the power is transmitted from pushers on the power trolleys to the free trolleys which carry the load. When power is not required at specified storage or stationary assembly locations, the power line is raised to disengage the free trolleys. An ever increasing number of manufacturers are finding this system an ideal solution to their production requirements for a conveyor that provides a combination of automatic handling, stationary assembly facilities and live overhead storage.

Write to us on your company letterhead and we will be happy to place your name on the Webb mailing list to receive factual technical information on conveyor installations, case history reports, and new product literature.

JERVIS B. WEBB CO.

Specialists in Custom Conveyor Systems

8933 ALPINE AVENUE • DETROIT 4, MICHIGAN

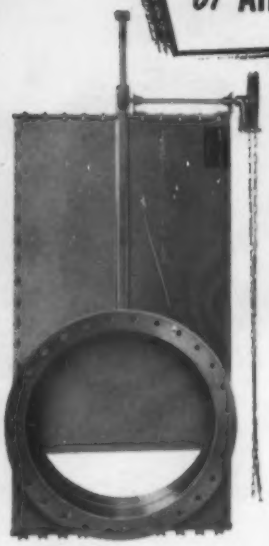
4382

Offices and Representatives Throughout The World • FACTORIES: *Detroit* • *Los Angeles* • *Hamilton, Canada*

For more facts circle 591 on Reply Card

"Slide" or "Blast Gate"
Every Plant Needs 'Em

for QUICK-EASY CONTROL
AND POSITIVE SHUT-OFF
of AIR · GASES · LIQUIDS · SOLIDS



The full flow area, easy control and shut-off features of these "Blast Gates" make them dependable units for pipe lines and processing equipment. They are made in any required metals, in 1" to 24" pipe size, with manual or automatic operators, to meet any required operating condition.

Relatively low in first cost, easy to install, rugged, efficient, compact.

Write for Catalog.

Large "Kwikleen" slide valve with chain wheel control; has removable bottom plate and hose connector for quick clean-out of accumulated solids by air, steam or water.

Standard flanged "Kwikleen" valve with hand lever control.

Standard cast iron threaded slide valve with pull handle; available also with lever, handwheel or chain wheel.

Fabricated aluminum slide valve with rectangular opening.

Slide type proportioning valve with air diaphragm operator.

ROCKWELL SINCE 1888 BUILT

W. S. ROCKWELL COMPANY

BUTTERFLY VALVES • SLIDE VALVES • AUTOMATIC VALVES

2925 ELIOT STREET • FAIRFIELD, CONN.

Sales Representatives in Principal Cities

For more facts circle 592 on Reply Card

NEW PRODUCTS

(Begins on page 134)

explained, provide the gripping surfaces for constant traction, even on wet, oily, or greasy areas. Packaged in self-storing metal cans, NSC will sell for about $11.00 per 14½-lb can, sufficient to coat about 100 sq ft. Walton-March.

36—FEED PUMP has horizontally split casing

Type BI boiler feed pump is announced for requirements of high pressure ratings below those of barrel-type pumps. Available in 6, 8, and 10 stages, the pump is patterned after the barrel type, but has a horizontally split casing so that the upper half can be removed without disturbing the piping. The capacity range of the three impeller sizes is 225-350, 275-425 and 350-525 gpm. The head per stage is about 280-200, 300-240 or 310-250 ft.

The pump is designed for both radial and axial balance and is available with either ring-oiled, water-cooled ball bearings, or sleeve bearings with Kingsbury thrust, ring oiled and pressure lubricated by oil pump. Its deep stuffing boxes are arranged for water cooling from an external source. Allis-Chalmers Mfg. Co.

To receive product data circle item numbers on the handy Reader Service Cards provided on pages 213-214.

37—PIPE COVERING for preventing condensation drip

NoDrip Tape, a plastic cork pipe covering is claimed to stop cold water drip permanently and without the aid of vapor seal tapes or overwraps. NoDrip Tape is described as a complete, protective covering in itself—offering a built-in moisture barrier which resists water absorption under extreme variations of temperature and humidity. It is self-adhering, says manufacturer, and can be applied without seams or ends coming loose. It can be used to cover joints, and valves as well as pipes. Installation is accomplished by hand wrapping the tape spirally around the pipe or tubing. Brown in color, this covering can be painted with ordinary water emulsion paints. J. W. Mortell Co.

38—MULTI-POINT INDICATOR with manual switching

Designed to scan a number of process variables by use of a manual switching arrangement on front panel, the Type HJ Precision Indicator may be used with provision for measuring up to 48 circuits, or in conjunction with a multipoint strip-chart recorder to obtain an intermittent record. According to company engineers, the instrument incorporates a magnetic standard to provide continuous measurement and standardization. Utilizing this

STANDARD SOLVES UPKEEP PROBLEMS, TOO!

Plant maintenance is more than machine care!
That's why the same Standard Oil Industrial Salesman you depend on for lubricating and cutting oils helps you solve upkeep problems, too.
Like floor, tree and lawn care—insect and weed control.
On the one call, you save time and trouble by ordering supplies that not only help keep your plant *operating* its best—but also *looking* its best, inside and out—with quality products by Standard.

So for easier, more efficient *complete* plant maintenance, put your problem in the capable hands of your Standard Oil Industrial Salesman.

FLOORS AND FURNITURE

Self-polishing! Fast drying. For linoleum, asphalt tile, rubber tile, composition and finished hardwood floors. Apply with mop or pad. No buffing. Resists heaviest traffic.

Hard, waterproof, permanent seal for wood, cork, Masonite and concrete floor surfaces. Protective resins and gums penetrate deep—form tough non-gloss, non-slip base for wax or finish.

Tough! Non-slip gym-type finish for wood, cork, linoleum, magnesite, concrete. Easily applied. Resists boiling water, rubber markings, alkalies, mild acids, heat and cold.

Cleans, polishes unfinished floors, woodwork, furniture, in one operation. Applies easily with mop, sprayer or soft cloth. Restores lustre—conceals scratches, keeps down dust.

TREES AND LAWNS

Kills broad-leafed weeds like dandelions, plantains. Harmless to grass. Sure, field-tested. An amine concentrate to be mixed with water for easy, economical weed control.

Destroys crabgrass and prevents reseeding. Effective in any size area. Will not affect desirable grasses. Fast, easy to use just as it comes from the can.

STANDARD Brush Killer is highly effective against woody plants. Kills oak, hickory, elm, osage orange, brambles, poison ivy, poison oak, hawthorn and many others.

STANDARD Elm Spray destroys the insect carriers of Dutch elm disease and elm phloem necrosis. Can also be used to control many leaf eating insects and scale insect crawlers.

STANDARD Summer Emulsion Concentrate (VERDOL). Safe—effective. Gets scale crawlers, red spiders and white flies. Use alone—or with lead arsenate or nicotine.

FLYING, CRAWLING INSECTS

A non-toxic pyrethrum spray approved for use where food is handled. Sprayed toward the ceiling, it gives fast knock-down and maximum kill of flying insects. In addition, it is very effective when sprayed on crawling insects.

Handy for spraying closets and rooms to kill flies, mosquitoes, moths and other flying insects. Press the button on the can—the pressure does the rest.

Concentrated killer for fly and mosquito control when sprayed on screens, around doors, and on shrubs. Mixes easily with water. Leaves a long-lasting, insect killing deposit.

STANDARD Insect Spray with DDT is especially recommended for surface spraying inside buildings. Gives long-lasting residual effect—controls insects for weeks. All mixed—ready to use.

Your Standard Oil Industrial Salesman is ready to serve you any time. Just give him a call. He'll see that you get fast delivery service from the nearest of hundreds of well-stocked warehouses all over the Midwest.

STANDARD

STANDARD OIL COMPANY
(Indiana)

For more facts circle 593 on Reply Card

with

R-W "Zig-Zag"®

CONTINUOUS POWER CONVEYORS

Photo above clearly shows extreme flexibility possible with Zig-Zag Conveyor. Note short radius return curve, variety of dips and rises, and minimum superstructure.

With America's ever-expanding economy comes the need for more production space. And, when space is at a premium, cramped working conditions and materials-handling bottlenecks always appear.

Today, more and more companies are finding a solution to these problems with Richards-Wilcox ZIG-ZAG Continuous Power Conveyors. ZIG-ZAG Conveyors operate *continuously . . . overhead . . .* keeping things moving on the production line and between departments, and releasing valuable floor space for other purposes.

ZIG-ZAG Conveyors operate with maximum economy, versatility and flexibility. They move up, down, in, out and around, "like water through a pipe". ZIG-ZAG is designed to handle in continuous production any load a man can lift. Carrying pendants are located on 6-inch centers and a choice of drive units permits travel at any required speed with variations of 10 to 1 or better. And when changing conditions require alteration, expansion or relocation of ZIG-ZAG Conveyors, the job can be easily performed by plant personnel, usually without waste of a single part.

Richards-Wilcox ZIG-ZAG Continuous Power Conveyors keep production on the *go*. For full information on how they can help you, write for descriptive catalog No. A-93.

75 YEARS of QUALITY and SERVICE by RICHARDS-WILCOX AURORA, ILLINOIS

Richards-Wilcox Mfg. Co.

MATERIALS HANDLING DIVISION
Branches in Principal Cities

460 W. THIRD STREET, AURORA, ILL. SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT • INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS

For more facts circle 594 on Reply Card

NEW PRODUCTS

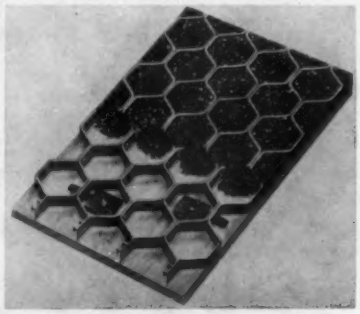
(Begins on page 134)

circuit is claimed to eliminate maintenance and replacement associated with dry cells, standard cells, and slide wires. It also allows operation in ambient temperatures from zero to 125 F.

The use of plug-in components — range resistor, reference junction oven, and tubes — combined with standard-unmatched tubes helps make the instrument easy to service. Indicator is available in two basic types, d-c potentiometer or a-c bridge, and it can be provided as a single-point or multiple-point instrument. The scale is concentric and rotating, 32¾ in. in length. Response time for full-scale travel is optionally 4 or 12 sec or 60-cycle operation. General Electric Co.

39—SAFETY FLOOR ARMOR greater steel surface

Hexteel Surface Armor is described as a safety floor armor with less weight per square foot and greater exposed steel surface. It is believed to create an unusually durable floor for abnormal wear and rough usage, although economical to in-



stall. The exposed steel surface armor is 18.15 sq in. per square foot and weight is 1.7 lb per square foot.

Hexteel Surface Armor, filled with a hot or cold mastic, is suggested for resurfacing ramps, aisles, parking areas, loading docks and traffic surfaces. Manufacturer points out that, in addition to its safety and economy factors, a major advantage is that it can be used as a steel armor in new concrete floor installation, or in conjunction with a mastic fill on existing concrete or existing or new wood floors. When installed, it forms a continuous steel floor armor which eliminates cracking, swelling, warping and shrinking, it is noted. The panels are fabricated for simple installation. Sides and ends are locked together on the job site to form a continuous steel armored floor. Klemp Metal Grating Corp.

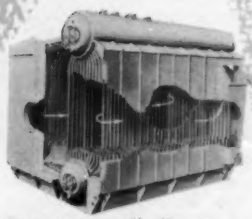
40—STEEL VALVES feature improved internal design

Improved internal streamlining, which lessens wear and reduces pressure drop, is announced for this re-designed 600-lb line of globe and angle stop, check and

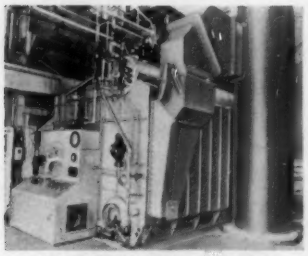
now... Combustion's VP Boiler with a

NEW LOOK

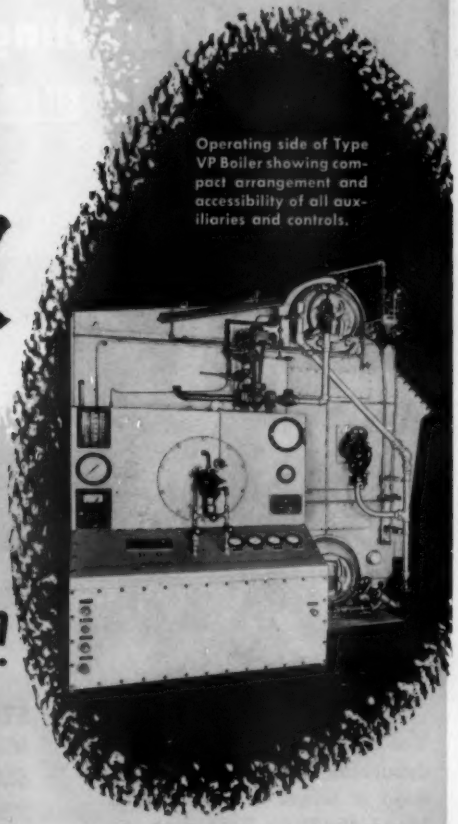
gives you more steam per dollar!



Cutaway view showing arrangement of two-pass VP Boiler.



Industrial installation of VP Boiler in the South. Capacity — 33,000 lb steam per hr; design pressure 250 psi.



Operating side of Type VP Boiler showing compact arrangement and accessibility of all auxiliaries and controls.

THE VP BOILER is available in capacities ranging from about 4,000 to 40,000 lbs of steam per hr, and pressures up to 500 psi.

Combustion's well-known C-E Package Boiler, Type VP, has a *new look* . . . outside and inside!

Outside. The VP's exterior is more streamlined, more compact. The controls and fan are now an integral part of the boiler front. Duct work is simplified. This means better appearance, easier maintenance, better operation.

Inside. Now instead of 2" diameter tubes you'll find 2½" tubes swaged down to 2" at the drums — in all sizes above 15,000 lb per hr capacity. This permits closer spacing of the tube surfaces in the main boiler bank and results in up to 25 per cent more heating surface per tube. It increases mass flow rates, assuring more efficient heat transfer. All this adds to up more steam than from the former VP Boilers of the same size.

All of the existing *extra* features which contributed to the enthusiastic acceptance of the original VP design remain. Briefly summarized they are:

- **More water cooling** per unit of furnace volume than any other boiler of the VP's size and type.
- **Quiet centrifugal fan,** which operates at low speed and with an exceptionally low noise level.
- **Large lower drum,** which facilitates handling wide load swings . . . permits a simple, symmetrical tube arrangement . . . simplifies inspection.
- **Single Burner** assures balanced furnace conditions and air distribution . . . is easier to operate and to maintain . . . simple burner control equipment . . . no air leakage through idle burner . . . change oil gun, when required, in seconds.
- **Simple baffle arrangement,** which means maximum heat transfer rate . . . no dead gas pockets . . . simplified soot blowing.

The *New* VP Boiler not only looks more attractive but it is functionally improved and stands ready to deliver more steam per dollar.

Write, today, for complete information. Ask for new catalog VP-126 (just off the press) which contains specifications and general information on dimensions, space requirements, construction details and controls.

COMBUSTION ENGINEERING

Combustion Engineering Building • 200 Madison Avenue, New York 16, N. Y.

BOILERS, FUEL BURNING & RELATED EQUIPMENT; PULVERIZERS, AIR SEPARATORS & FLASH DRYING SYSTEMS; PRESSURE VESSELS; AUTOMATIC WATER HEATERS; SOIL PIPE

8-812A

For more facts circle 595 on Reply Card

Separates 7 cu. ft. of parts and tumbling chips in just 10 minutes

STEARNS MOBILE MAGNETIC PARTS SEPARATOR

You can separate steel parts from deburring chips in minutes instead of hours with a Stearns Magnetic Parts Separator. As mixture cascades from feeder, the powerful Stearns drum-type magnet lifts parts to belt which conveys them to demagnetizer. Non-magnetic chips fall into suitable receptacle for re-use.

Make these Stearns advantages work for you!

Big Labor Saver — No hand picking or screening. No attention required while unit is operating.

Non-Choking Adjustable Feeder — Regulates flow of material . . . handles parts of various sizes and shapes.

Positive Separation — Lift principle pulls steel parts up and out of chips or deburring compound . . . eliminates entrapment of parts.

No Magnet Operating Expense — Permanent, powerful Alnico V magnet needs no current.

Completely Self-Contained Mobile Unit — No separate feeders, chutes, hoppers. Just connect drive motor to current and you're ready to operate. Mounted on wheels for easy movement around plant.

Protection for Parts — Hopper and feeder are rubber-lined.

Parts Fully Demagnetized.

Find out how a Stearns Parts Separator cuts handling costs. Write today for Bulletin 110.

1089

MAGNETIC EQUIPMENT FOR ALL INDUSTRY

STEARNS MAGNETS

STEARNS MAGNETIC, INC., 669 S. 28th St., Milwaukee 46, Wis.

For more facts circle 596 on Reply Card

NEW PRODUCTS

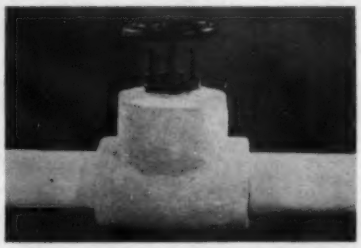
(Begins on page 134)

non-return cast steel valves. Features formerly available only in company's 900, 1500, and 2500 lb valves, are now incorporated into the 600 lb valves for easier operation and reduced maintenance. Among these are swivel disk construction, stellite faced disks guided the full length of travel using integrally cast guide ribs, integral stellited seats and the Impactor handwheel.

Valves in sizes of 8 in. and larger also feature an improved pressure-seal bonnet joint which gives more sealing force and sealing area. This pressure-seal design is claimed to eliminate leakage and afford easy disassembly and lasting bonnet joint tightness regardless of temperature. Edward Valves, Inc.

41—INSULATING CEMENT provides smooth finish

Super Powerhouse Cement is announced as a white insulating-finishing cement which provides both insulating properties and a smooth, white finish when applied alone or over regular insulating cement, block, blanket and other thermal insulation. When applied as the only insulating material on valves, flanges, fittings and

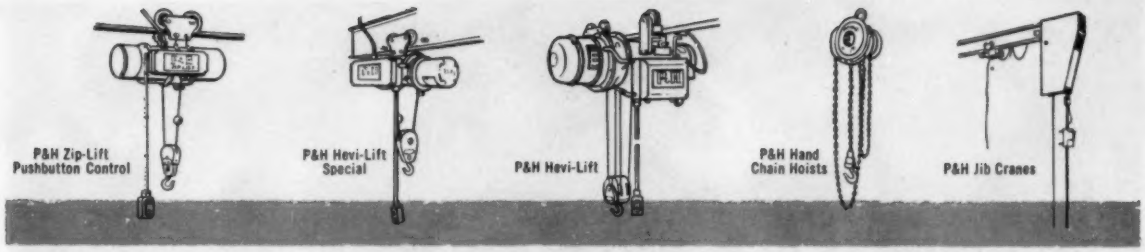


other irregular surfaces it gives a white finish which blends completely with adjoining white insulations.

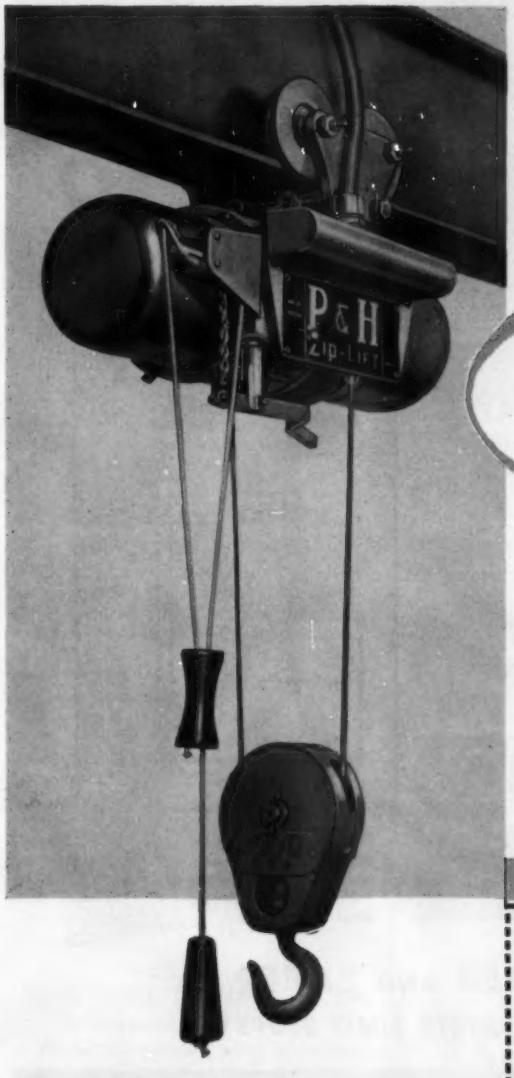
Made of long, fine fibers of spun mineral wool, the cement is said to offer better adhesion, easier mixing and improved handling and troweling qualities while retaining the characteristic density, coverage, low shrinkage, and high thermal efficiency of mineral wool cements. It can be used to temperatures of 1700 F and has a glazed white surface when finish-troweled. The hydraulic-setting material remains workable for one hour, sets to initial hardness within two to three hours, and according to manufacturer will withstand drenching rain after the initial set. The cement is available in 50 lb bags. Baldwin-Hill Co.

42—CLOSING DEVICE uses liquid carbon dioxide

The Cooperator—a circuit breaker closing device which uses liquid carbon dioxide as the source of power—is announced for operation independent of the regular source of control or power. It is portable and, manufacturer reports, has adequate power to close the breaker against fault currents equal to its full momentary rat-



Here's News! Now the P&H Zip-Lift Special gives you a wire rope hoist at electric chain hoist prices!



HERE'S another new hoist added to the most complete line in the business. And P&H has kept manufacturing costs down so that you can't afford to pass up this terrific value.

Just take a look at the price list on the new rope-control Zip-Lift Special!

Capacity	Price
250 lbs.	$145.00
500 lbs.	194.00
1000 lbs.	219.00
2000 lbs.	224.00

Two disc brakes on every hoist. Ten feet of lift is standard — available in 14', 18', and 20' lifts at slight additional cost.

Get hold of your P&H Distributor. Ask him to give you the complete information on this new unit — the P&H Zip-Lift Special. If you're in too much of a hurry to wait, send the coupon in to us. We'll see that you get complete specifications by return mail. P&H Hoist Division, Harnischfeger Corporation, 4565 West National Avenue, Milwaukee 46, Wisconsin.

Tear out and mail today!

P&H Hoist Division
Harnischfeger Corporation 3019
4696 West National Avenue, Milwaukee 46, Wisconsin

Gentlemen: The new Zip-Lift Special sounds like a money-saver to me. Send me complete information as fast as you can.

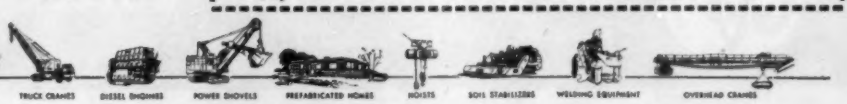
Name _____ Title _____

Company _____ Address _____

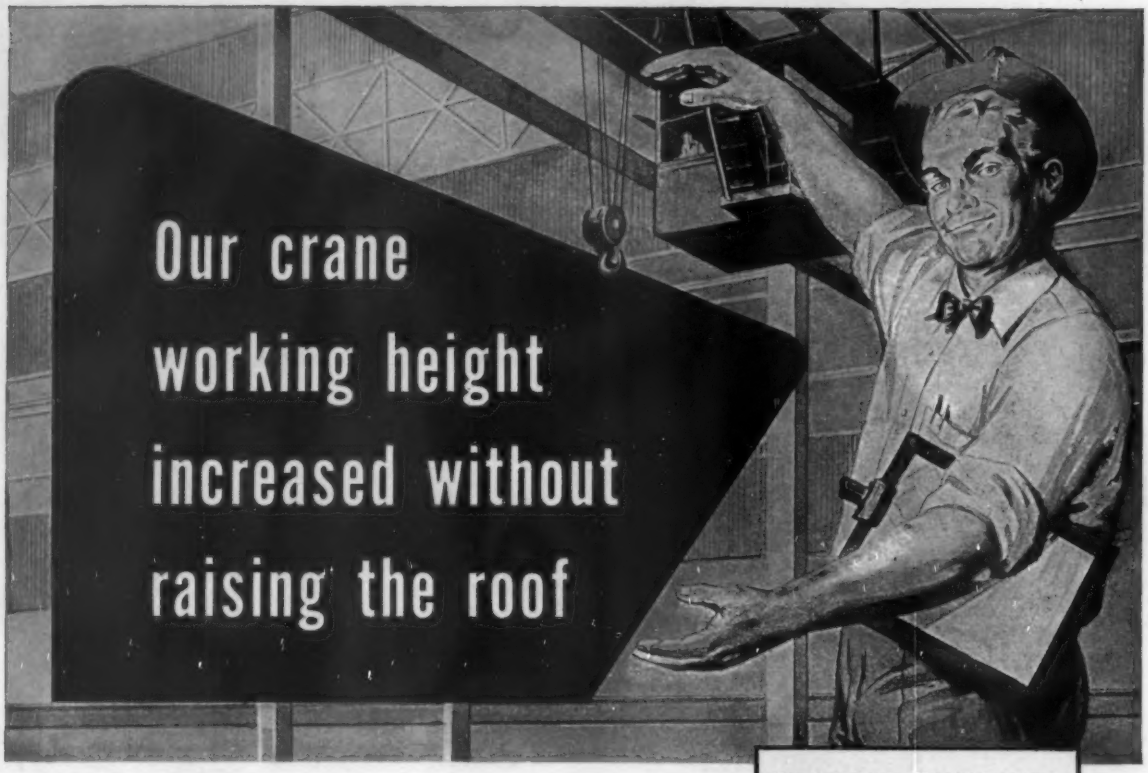
City _____ (___) State _____

HARNISCHFEGER

the P&H *Line*



For more facts circle 597 on Reply Card



WITH EC&M YOUNGSTOWN SAFETY LIMIT STOPS

"We frequently needed more headroom on our D-c cranes. The limit stop setting couldn't be raised without sacrificing the clearance needed by the hoist-brake to safely stop the fast-moving empty hook, which hoists 2½ to 3 times faster than when hoisting full load. We had a choice . . . we could raise the roof . . . which meant deeper footings, heavier building columns and increased costs for lighting, heating and ventilating . . . OR . . . we could equip our cranes with **quick-stopping** EC&M Youngstown Safety Limit Stops."

Yes, Youngstown Hoist Limit Stops not only disconnect power from the motor but also apply **dynamic braking** to aid the hoist-brake in a **quick stop** . . . giving less drift . . . more headroom. **Safe,** too, because the tripping point does not change . . . is not affected by stretching of the hoist cables. The point at which the rising crane-hook makes contact to lift the Youngstown suspended-weight always remains the same.

For increased D-c crane headroom, **plus safety,** investigate EC&M Youngstown Safety Limit Stops.

QUICK-STOPPING type of LIMIT STOP gives MINIMUM DRIFT
CIRCUIT-OPENING type of LIMIT SWITCH requires GREATER CLEARANCE FOR DRIFT
THIS SPACE SAVED

Write today for Bulletin 1032 which describes and illustrates EC&M Youngstown Limit Stops.

3775

YOU CAN LIFT LOADS HIGHER AND SAFER WITH EC&M YOUNGSTOWN SAFETY LIMIT STOPS

THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

For more facts circle 598 on Reply Card

NEW PRODUCTS

(Begins on page 134)

ing. It has a standard 10 lb bottle of CO_2 as a source for stored energy, a regulating valve, an intermediate receiver for holding the required amount of carbon dioxide gas for each closing operation at about 220 psi, a control valve which releases the gas from the intermediate receiver to close breaker, and a power cylinder and piston for closing circuit breaker. Up to 75 closing operations are obtainable from a single bottle of liquid CO_2. A reserve bottle is included to assure full supply at all times. The device will close all current designs of magneblast circuit breakers in the interrupting range from 100 to 500 mva, in both indoor and outdoor metal-clad switchgear. General Electric Co.

43—PORTABLE OXYGEN UNIT for emergency uses

With the Pocketaire Oxygen Unit anyone can administer oxygen anywhere, and without special training, the manufacturer of the unit reports. It can also be used for resuscitation by those trained to give normal manual respiration. The Pocketaire is a complete unit supplying two light weight standard "B" medical oxygen cylinders, a flow regulator with gage that gives a range of 3 to 7 liter flow of oxygen per min and two disposable masks. The unit includes a carrying case, weighs 17 lb altogether, and costs about $90.00. The Cyclo-Flo Co.

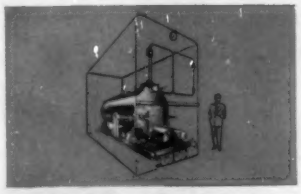
44—FIBER GLASS LADDER is strong and durable

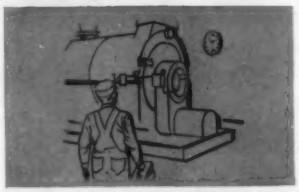
This fiber glass ladder combines the superior strength-to-weight ratio of light-metal ladders with the non-conducting qualities of wood ladders, manufacturer reports. Stronger and more durable than many wooden ladders, the fiber glass ladder incorporates sandwich construction. Available in both straight and extension styles, it combines fiber glass reinforced side walls with non-twisting aluminum or magnesium rungs which are plastic-welded to become an integral part of the ladder. Tests are reported to show strength-to-weight ratios exceeding that of most metals, and durability far exceeding that of wood, due to the superior resistance of this new ladder to chemicals, heat, and water. Putnam Rolling Ladder Co.

45—CLOSED CIRCUIT TV for continuous service

Expected to provide more dependable service in heavy-duty industrial applications, the RCA ITV System is said to be made more rugged for continuous, round-the-clock industrial service. It reproduces sharp, high definition pictures of 550 to 600 line resolution, unusually detailed for equipment of this type, according to manufacturer. The system's 10-in. monitor is aluminized for increased

CYCLOTHERM...
FEATURE for FEATURE
THE MOST ADVANCED DESIGN
in STEAM GENERATION!





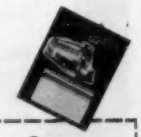
1. Most Compact For More Efficient Space Utilization! You can devote more space to storage and production. Or, you may need less space than you think. Cyclotherm requires minimum boiler room space. It has 40% less floor area and 75% less height than conventional units . . . is up to ⅓ smaller than other packaged units.

2. More Efficient Operation Reduces Fuel Costs! Cyclotherm guarantees a minimum 80% efficiency in oil and/or gas. Fuel changeover can be quickly made as fuel prices fluctuate. From cold start to full power takes only 15 to 20 minutes. Capacity can be reduced without losing peak efficiency.

3. The Finest Service Facilities In Steam Generation! *A nation-wide network* of factory-trained servicemen are available at any hour, weekdays and weekends.

4. Simplified Maintenance Saves Up To 50% In Costs! One maintenance man can clean return tubes . . . replace and clean burner nozzle. Firetube never needs cleaning.

Cyclotherm Steam and Hot Water Generators range from 18 to 500 hp . . . from 15 to 200 psi. For complete details on their many space- and cost-saving features, mail this coupon today for your free booklet.



YEARS AHEAD IN STEAM GENERATION
CYCLOTHERM®
Steam & Hot Water Generators

Cyclotherm Division, U.S. Radiator Corp.
3121 E. First Street, Oswego, N. Y.
Please send me a free copy of your booklet giving full information on Cyclotherm Steam and Hot Water Generators.

NAME .....
COMPANY .....
ADDRESS .....
CITY ..... ZONE ..... STATE .....

For more facts circle 599 on Reply Card

There's an easy way to raise profits for you in this picture!

Rapistan "Packaged" Power Conveyors cost Less . . . do more jobs

Rapistan power belt conveyors are standard units. They are interchangeable. Put them to work in different jobs anytime. They see more use, don't stand idle in a back room. When necessary, you can lengthen or shorten a Rapistan belt conveyor to suit new needs. That's making the most of an investment. Rapistan belt conveyors are safe investments, too, with pop-out rollers, guard rails, chain guards, gap plates and other features for worker protection. Put Rapistan belt conveyor together with Rapistan gravity conveyor, and you have a "controlled flow" system. That's economy!

ASK ABOUT BUILDING YOUR OWN SYSTEM with Rapistan "packaged" conveyor units. We'll send you literature showing how conveyors pay for themselves in profit increases and improved operations.

FREE ENGINEERING SERVICE is as close as your phone. Rapistan Sales-Service Agencies are located in major cities, ready to serve you. Distributors in most foreign countries.

Rapistan®
POWER CONVEYOR
The RAPIDS-STANDARD CO., Inc.
439 Rapistan Bldg. Grand Rapids 2, Mich.

For more facts circle 600 on Reply Card

NEW PRODUCTS

(Begins on page 134)

picture brightness and contrast. This closed circuit system is suggested for a wide range of industrial conditions requiring continuous observation under adverse conditions of shock, vibration, and temperature extremes, and in locations dangerous to personnel.

Among features of the system is a three-position tap switch which can be set for nominal line voltages of 105, 115 and 125 v. Power supply to all circuits is electronically regulated, permitting a fluctuation of approximately 10 v from each of the three tap-switch positions. This is designed to let the system operate efficiently over a voltage range of from 100 to 135 v. Engineering Products Div., Radio Corp. of America.

46—FHP MOTOR for hazardous atmospheres

Designed for operation in hazardous atmospheres, this explosion-proof fractional horsepower motor is constructed with heavy cast iron end shields for extra protection. Overbolt construction gives the motor assembly additional strength with little increase in weight. According to company engineers, the motor will give 10-years' normal service without relubrication due to the use of a new ball-bearing grease, which is highly resistant to oxidation and moisture. The motor is announced as Underwriters' Laboratories approved for Class I, Group D; and Class II, Groups E, F and G atmospheres. General Electric Co.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 213-214.

47—PROTECTIVE COATINGS resist chemical action

Protection against many corrosive reagents over a wide temperature range is offered by two new series of Neoprene-based coatings and linings. Both cure at room temperature. Neocor C-10 is a one-package spray or brush coating formulated to resist chemical spills, fumes and drips with a temperature range from –20 to 275 F. It is claimed to be resistant to salts, alkalies and all acids except the highly oxidizing ones, and to be unaffected by sunlight and weathering. According to manufacturer, brushed-on coats give a dry-film thickness of 4 to 5 mils per coat, and the coatings dry fast and cure to tough, abrasion resistant films. Standard colors are black, light and dark grey, red and aluminum.

Neocor HD is a two-package lining designed for immersion service with an effective temperature range from –65

NEW PRODUCTS

(Begins on page 134)

to 300 F. Brush or spray applications give a film thickness of 20 to 30 mils per coat, it is reported, and it is possible with one coat of primer and two topcoats to develop tank linings 60 to 65 mils thick. Neocor HD is supplied in black. The Corrosion Control Co., Inc.

48—CUTTING MACHINE is oscillating type

The Sever-All, a dry abrasive cutting machine, is announced as capable of a speed approximately 3 sec per square inch of material being cut. Available in both stationary and portable models, the machine is designed to handle material to 4 in. sq at 90 deg to axis for solid steel, 8 in. by 90 deg to axis for channels. It uses an 18 in. diam cutting wheel with a 10 hp motor, work size cutting capacity being reduced when a smaller diameter wheel and less horsepower is used. The wheel is lowered into the work by a hand lever. The 1 in. diam wheel spindle is driven by a V type belt.

Since the Sever-All is an oscillating type machine, the amount of abrasive wheel contact is reduced and cutting is done with a minimum of pressure on wheel. This, company points out, assures longer wheel life and cleaner cuts with a minimum of burr. A double-acting work holder serves to automatically position material in center of work support, positioning the center of the work piece in line with center of wheel. Material is then clamped at both sides of cutting wheel by a crank handle. The machine is compact—62 in. high. Campbell Machine Div., American Chain & Cable Co.

49—ARC WELDER is versatile portable unit

Model 165A A-C Arc Welder is designed as a portable welder for plant maintenance and construction, but is claimed rugged enough for continuous production welding. The welder is wheeled like a hand truck. Voltage characteristics of the welder simplify arc striking and welding for the inexperienced welder or mechanic. The current rating is 15 to 180 amp, making it possible to weld ½ in. steel plate with ease, it is noted. Besides arc welding, the unit can be used with carbon torch for heating, soldering, brazing and welding of brass and aluminum. Illumi Tronic Engineering Co.

50—RELAYS, CONTACTORS are mechanically-latched

Designed for maintaining continuity of sequencing in the event of power interruptions, these mechanically-held contractors and relays are also suggested for use where quiet operation is required. They eliminate continued energization of the coil, thus eliminating coil hum, according to company engineers. After main device coil is momentarily energized to seal the contacts, the mechanical latch

There's a new way to cut costs for you in this picture!

New Rapistan FLOW RACK speeds order selection, adds storage space

Deep-storage FLOW RACK eliminates the need for many aisles in storage areas. This gravity conveyor racking system cuts down costly delays, provides fingertip access to inventory, speeds up order selection and turns "dead" aisle space into useable storage depth. FLOW RACK relieves employees of physical lift-and-lug, increases their per-hour value, and cuts overtime costs. FLOW RACK can be installed in a matter of hours by your own crew, without welding. It can be removed and reinstalled in another location, and can be extended either in depth or width at any time. FLOW RACK is available in standardized units for handling products of any size, weight or type . . . flat cartons, mattresses, bottled goods, small parts, foods and many others!

OUR FREE BOOKLET "FLOW RACK" contains many new money saving, time saving ideas for using FLOW RACK in production, storage, shipping, receiving and inventory operations in many industries. Write today.

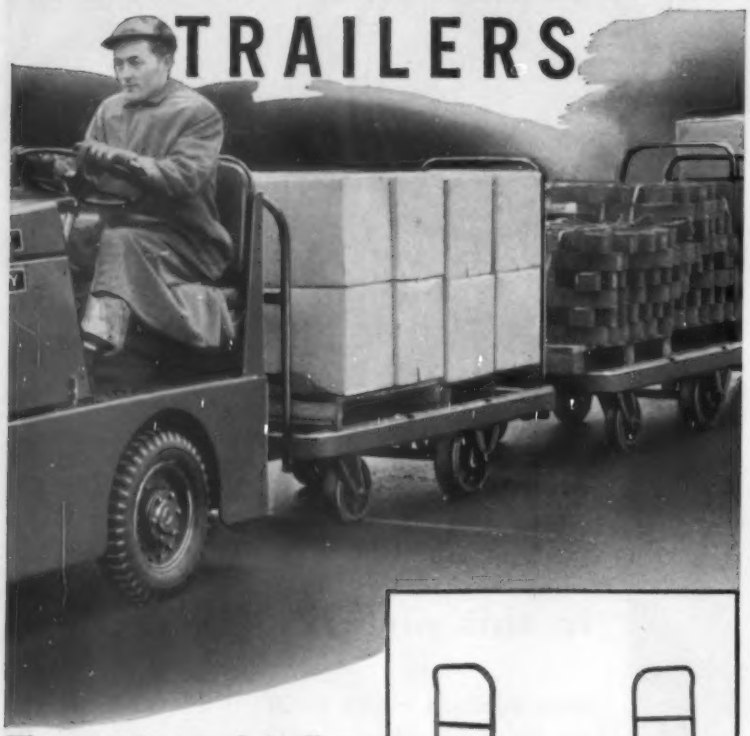
Rapistan®
FLOW RACK
The RAPIDS-STANDARD CO., Inc.
439 Rapistan Bldg., Grand Rapids 2, Mich.

THERE'S A RAPISTAN SALES-SERVICE AGENCY near you, with factory-trained experts ready to serve you with experienced know-how. Distributors in most foreign countries, too.

For more facts circle 601 on Reply Card

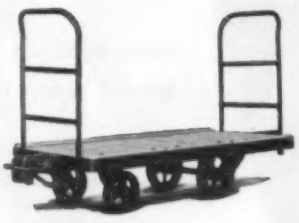
TONNAGE TRAVELS FOR LESS ON THE MERCURY "TRACKLESS TRAIN"

MERCURY TRAILERS



The most complete line of industrial trailers

Save valuable man-hours with the *low cost* tractor-trailer method. Free of any fixed path — the versatile Mercury "TRACKLESS TRAIN" travels wherever material movement dictates... long hauls, short hauls or snaking through congested areas. Delivers *more* tonnage at *lower cost* because the "Trackless Train" keeps loads on wheels and readily movable by hand for short distances. Moves more tonnage by merely adding more trailers . . . no increase in power units.



Mercury A-310 Castor Steer Trailer—For nearly a half century industry has accepted the A-310 Trailer as its standard because of its suitability for general all-purpose work and its ability to provide the lowest cost transportation per ton mile.

Mercury trailers are designed to meet the flexible requirements of the user. Models include castor steer, fifth-wheel steer and four-wheel steer trailers in capacities ranging from 2000 to 60,000 lbs. . . . decks and bodies can be built to suit the commodity handled. Find out how Mercury trailers will save you money and solve the problem of horizontal movement of materials.

Write for free bulletins describing Mercury trailers today.

MERCURY
FORK TRUCKS · TRACTORS · TRAILERS

MERCURY MANUFACTURING COMPANY
4002 South Halsted Street • Chicago 9, Illinois
For more facts circle 602 on Reply Card

NEW PRODUCTS

(Begins on page 134)

locks contacts in position until latch coil is energized. For this reason, when power is restored after a failure, sequenced operations will resume at the exact point in cycling where they were cut off, it is pointed out.

With contacts interchangeable from normally open to normally closed position without additional parts, the mechanically-held devices are front-connected for convenient wiring. Contact springs are permanently attached to movable contacts to facilitate removal and installation. Contactors are available in NEMA sizes 00, 0, 1, open and enclosed, and in 1, 2, 3, and 4 poles. Multipole relays are available in 10-amp, 600-v max ratings, open and enclosed, and with 2, 3, 4, 6, and 8 poles, in any combination of normally open and/or closed positions. General Electric Co.

51—SPRAY LUBRICANT for high-temperature uses

Spray-Lube, a new type of extreme pressure lubricant, makes it possible to spray a superior, heavy duty lubricant on open gears, open chains, valve stems, without

preheating and then applying with brush or paddle, according to manufacturer. It can be used in temperatures too high for normal grease or oil, it is said, and will not drip or throw off running gears. Excellent adhering qualities make it a good rust preventive, says company. It comes in an aerosol dispenser, sells for about $1.25 a can, and is shipped in 6- or 12-can cases. Pressure Products Co.

52—EVAPORATOR has wipers for self-cleaning action

This self-cleaning evaporator is offered as a solution to scaling and corrosion problems inherent in mass evaporation and concentration processes. Presented under the trade name, Sebava, by which it has been known in Europe for several years, this evaporator is claimed to offer advantages in operating efficiency over similar equipment in use in this country. It is explained that the problem of scale formation is solved in the Sebava Evaporator by means of revolving stainless steel wipers which maintain clean, non-scaling heat transfer surfaces. The wipers also help speed evaporation by spreading a thin film of liquid over heating surfaces to produce high turbulence and, thus, rapid evaporation.

Capacities of the evaporator range from a pilot model capable of handling 65 lb of distillate per hour to the largest

No other drive does all these jobs like

Link-Belt SILENT CHAIN

YES, if you need a drive like any one of these six, you're money ahead with SILENT CHAIN

COMBINING the flexibility and quietness of a belt with the positive action and durability of a gear — Link-Belt Silent Chain offers unmatched advantages for a wide range of drives. Check these reasons why:

- Lower cost—often lower in first cost, always lower in ultimate cost.
- Longer life — trouble-free performance for 25 or 30 years is common.
- No dismantling machine or removing sheaves for repairs.
- Better than 98% efficiency.
- Maintained ratio assures full productive capacity.
- Slipless action assures a better product.
- Easy to install.
- Safe to employees — operates in oil-retaining casing.

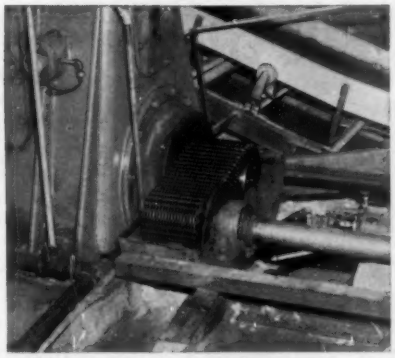
New 88-page Book 2425 gives complete data on silent chain. Ask a Link-Belt engineer or distributor for your copy today.

LINK-BELT

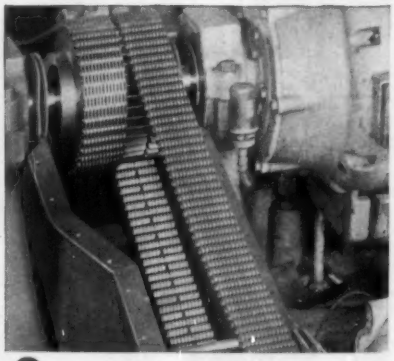
13,102

SILVERSTREAK SILENT CHAIN DRIVES

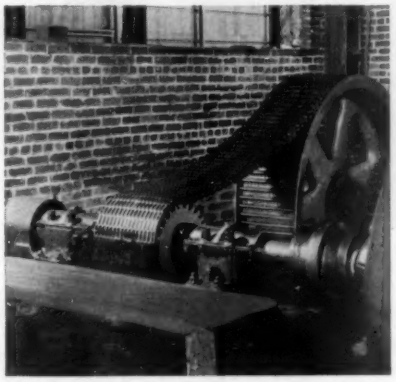
LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.



1 **Production increased 33%** when speed of this peeler lathe was stepped up by installing two silent chain drives. Neither engine nor lathe had to be moved.

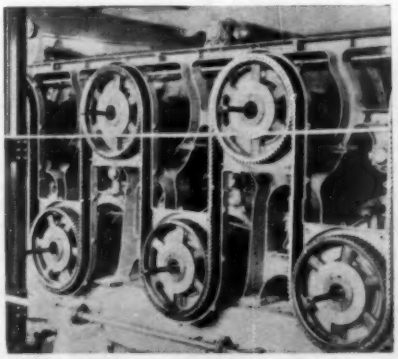


2 **Constant, high speeds** were assured by equipping each of 48 automotive test stands with two Link-Belt Silverstreak Silent Chain Drives.

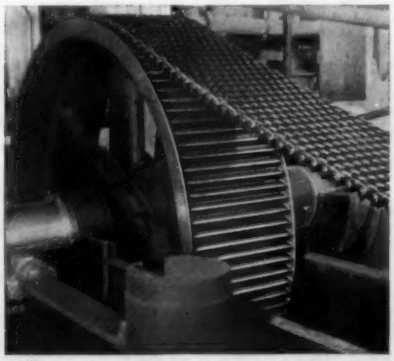


3 **Long life under severe service**—This 250-hp Link-Belt Silent Chain Drive has operated line shaft in cold draw section of seamless tube company since 1916.

4 **Fractional hp drives** are positive and dependable with Link-Belt Silent Chain. Above, two 3/16" pitch chains drive machine fabricating refrigerator parts.



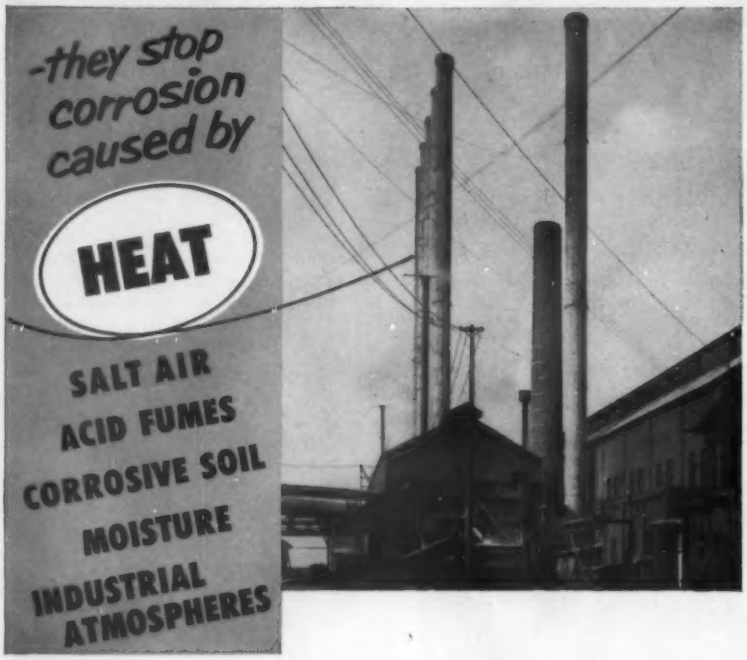
5 **Accurate timing** is guaranteed for this dryer by Link-Belt Duplex Silent Chain. All shafts travel at uniform angular velocity, permitting precise coordination of process.



6 **Minimum maintenance**—This is one of 24 Link-Belt Silent Chain beater drives in a pulp mill. All have operated for many years with little attention.

For more facts circle 603 on Reply Card

You can solve your tough corrosion problems by using Bitumastic® Coatings



TOUGH CORROSION PROBLEMS can be solved, but not by using ordinary paints or conventional protective coatings. For long-term protection, it takes *specialized* protective coatings . . . the Bitumastic Coatings Koppers makes.

Take these stacks, for example. Heat caused ordinary coatings to "give up" in two weeks to a month. Then, one thin coat of Bitumastic® Hi-Heat Gray was applied. After four years' service, this specialized coating was *still* in good condition.

Hi-Heat Gray resists intermittent temperatures as high as 1200° F. It contains metallic zinc powder which, at high temperatures, tends to fuse to the underlying steel, providing a protection similar to metallic zinc.

No one coating can stop all kinds of corrosion. Therefore, Koppers makes an entire family of Bitumastic Protective Coatings. Send for free booklets describing them. At the same time, tell us about *your* corrosion problem so that we can recommend a method for its satisfactory solution. There is no obligation, of course.

KOPPERS COMPANY, INC.
Tar Products Division, Dept. 423-T, Pittsburgh 19, Pennsylvania
DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.

MADE ONLY BY KOPPERS
BITUMASTIC PROTECTIVE COATINGS
SOLD THROUGH INDUSTRIAL DISTRIBUTORS
KOPPERS ®

For more facts circle 604 on Reply Card

NEW PRODUCTS

(Begins on page 134)

standard unit which can produce 6000 lb of distillate per hour. Power requirements for operation are approximately 8 kwh per 1000 lb of distillate or 125 lb per kwh, plus a small amount of make-up heat in specific applications.

Simple in construction, the evaporator consists of six major components: a boiler shell in which evaporation takes place; a stainless steel bank of evaporating-condensing diaphragms inside the boiler; twin rotating wipers between the diaphragms; a compressor; a control panel containing instruments for automatic operation; and, where required, heat exchangers. Roots-Connersville Blower Div., Dresser Industries, Inc.

53—ELECTRIC CHAIN HOIST offers many features

Besides being designed to serve without maintenance for its normal life, the CM Lodestar is announced as having shock-proof push button control, sealed-in lifetime lubrication, self adjusting brake and other features, including light weight,

compact size and low headroom. According to company, a jam-proof chain guide and non-kinking flexible link chain enable this hoist to be used for extreme angle pulling. The single-phase model (without contactor) can be used for side pulling. It can also be used upside down for jobs where it is inconvenient to install a hoist overhead. Used this way, the hoist "lifts" itself with the load.

Interchangeable suspensions are another feature. Swivel or rigid hooks and lugs, and adapters are interchangeable on all models. The CM Lodestar comes in capacities from ⅛ to 1 ton for operation on single-phase 115-v and three-phase 208-220/440-v 60-cycle power. Prices start at $149.50. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp.

54—FLOAT VALVE for controlling liquid level

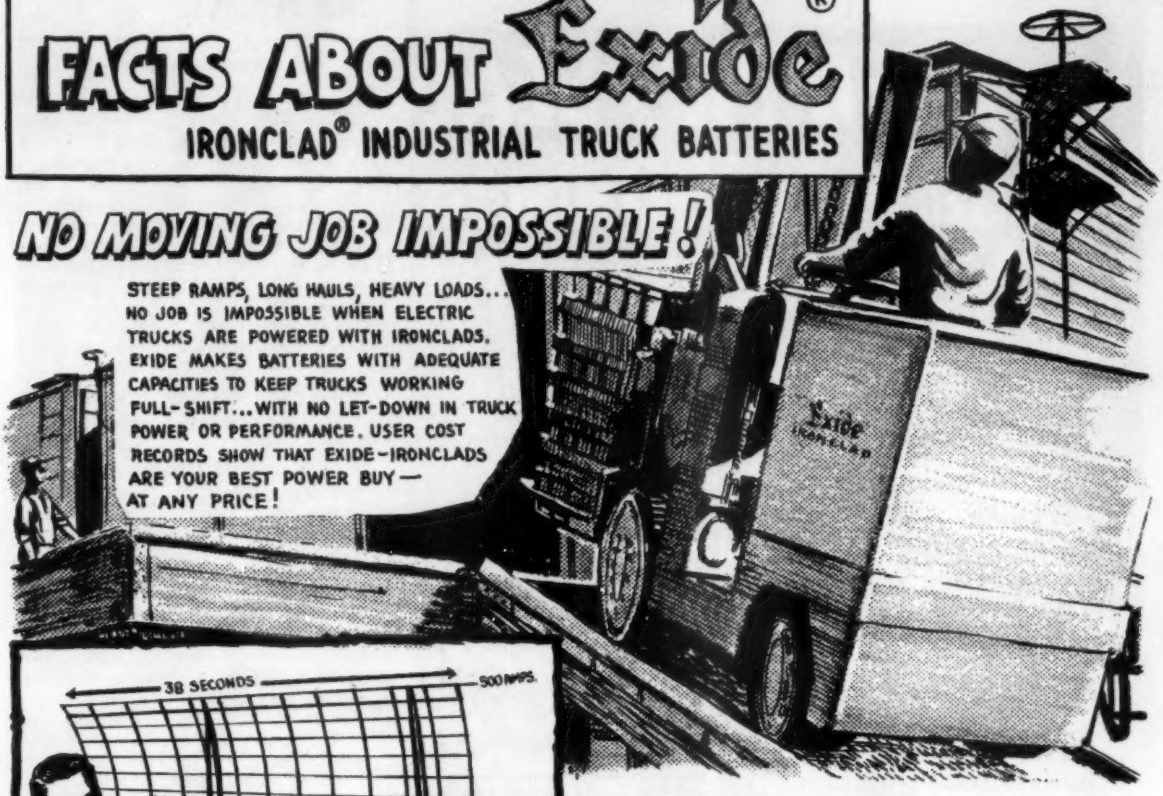
The 1620 Series Float Valve for controlling levels of liquids is suggested for use in air conditioning installations, power plants, textile mills, water works, packing plants, breweries, chemical plants. They are used to maintain level in open

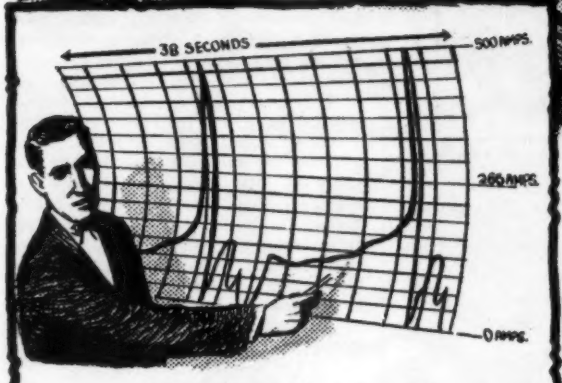
FACTS ABOUT Exide®

IRONCLAD® INDUSTRIAL TRUCK BATTERIES

NO MOVING JOB IMPOSSIBLE!

STEEP RAMPS, LONG HAULS, HEAVY LOADS... NO JOB IS IMPOSSIBLE WHEN ELECTRIC TRUCKS ARE POWERED WITH IRONCLADS. EXIDE MAKES BATTERIES WITH ADEQUATE CAPACITIES TO KEEP TRUCKS WORKING FULL-SHIFT...WITH NO LET-DOWN IN TRUCK POWER OR PERFORMANCE. USER COST RECORDS SHOW THAT EXIDE-IRONCLADS ARE YOUR BEST POWER BUY— AT ANY PRICE!





PORTRAIT OF AN EXIDE WORKING

IN JUST TWO MOVES AND 38 SECONDS A FORK TRUCK MAY DRAW ENERGY FROM ITS BATTERY IN THIS PATTERN, IN RESPONSE TO 44 SEPARATE CONTROLLER OPERATIONS. IN AN 8-HOUR SHIFT, 3000 SUCH DEMANDS MAY BE MADE. EXIDE-IRONCLADS ASSURE RAPID, ACCURATE HANDLING OF MATERIAL... THEY RESPOND INSTANTLY TO THESE RAPIDLY RECURRING DEMANDS FOR HIGH POWER FOR SHORT DURATIONS.

TUBES OF POWER WORK FOR YOU INSIDE AN IRONCLAD

SLOTTED TUBES INSIDE AN IRONCLAD KEEP ACTIVE MATERIAL IN FIRM CONTACT WITH CONDUCTING GRIDS OF THE POSITIVE PLATE...THIS GRID PROTECTION LENGHTENS THE LIFE OF THE BATTERY. SLOTTED TUBES EXPOSE MORE ACTIVE MATERIAL TO THE ELECTROLYTE... FOR GREATER POWER. FINE TUBE SLOTS HOLD MATERIAL IN CONTACT WITH GRID LONGER...RESULT, THE IRONCLAD'S ABILITY TO DO YOUR MATERIALS MOVING JOB FOR A LONGER PERIOD OF TIME. THAT IS WHY EXIDE-IRONCLADS ARE YOUR BEST INDUSTRIAL TRUCK BATTERY BUY— AT ANY PRICE!

LET EXIDE HELP SOLVE YOUR INDUSTRIAL TRUCK BATTERY PROBLEMS. ❶ CALL AN EXIDE SALES ENGINEER FOR FULL DETAILS. ❷ WRITE FOR FORM 1982, A MANUAL ON INSTALLING AND MAINTAINING MOTIVE POWER BATTERIES.

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

For more facts circle 605 on Reply Card

NEW CHEMPRO SEAL INSTALLED IN ONLY 30 MINUTES

NO SPECIAL HOLDING CLAMPS

NO MACHINING OF STUFFING BOX FACES

The new Chempro mechanical seal can be installed in only 20-30 minutes—it requires no special holding clamps or machining of stuffing box faces. It is completely interchangeable with stuffing box packing.

Chempro seals give highly economical service on pumps handling acids, caustics, solvents and other chemical liquids and slurries under a wide range of operating conditions. It has been successfully used under slurry conditions that previously could not be sealed by a mechanical seal.

The seal faces rotate within the confines of the stuffing box, eliminating the hazard of dangerous sprays in handling corrosive, toxic, explosive and flammable materials.

OTHER ADVANTAGES

Simplicity of Design—Only 8 pieces, involving no complicated parts • External Seal—adjustable after installation • Chempro Teflon® Packing—Chemically inert • Eliminates Shaft Scoring • Low Power Costs—Minimum friction load on shaft • Custom Built—To meet particular operating conditions.

For complete details write for new Bulletin CP551.

• Patented ®du Pont's trademark for its tetrafluorethylene resin

CHEMICAL & POWER PRODUCTS, INC.

The Original Fabricators of Teflon Packings and Gaskets

7 Broadway, New York 4, N. Y.

For more facts circle 606 on Reply Card

NEW PRODUCTS

(Begins on page 134)

storage tanks, process tanks, spray ponds, cooling tower basins and similar liquid reservoirs. Construction is mainly bronze and steel, but the floats are also available in other metals for special applications. Requiring a minimum of maintenance, this direct-acting control can be ordered in 11 sizes, from ¼ to 4 in. Larger sizes are supplied with a semi-balanced, double-seated valve. This valve is suggested particularly for slurries or liquids containing suspended solids. Fulton Sylphon Div., Robertshaw-Fulton Controls Co.

55—TRANSMITTER measures, transmits temperatures

A non-indicating device of the "force balance" type, the Model 12A Temperature Transmitter is designed to measure process temperatures and pneumatically transmit the information to a central recording or controlling station. It is designed around a gas filled thermal system which exerts force on a flapper-nozzle mechanism in proportion to the measured temperature. The resulting back pressure in the nozzle circuit, amplified through a relay and converted to a force through a bellows, balances out the initial force and constitutes the 3 to 15 psi output transmitted by low cost tubing to the receiving instrument.

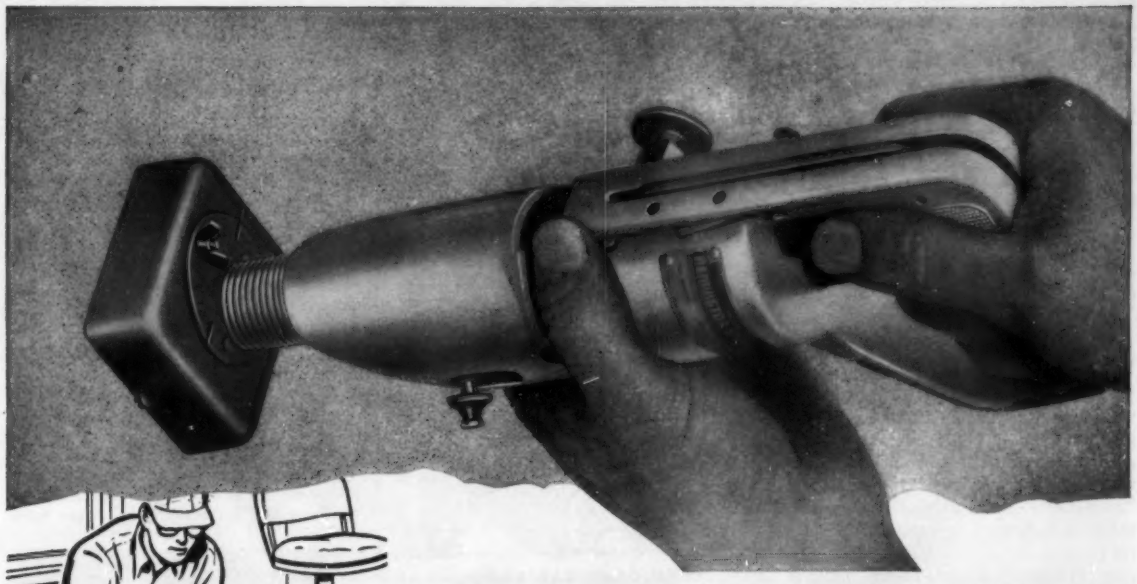
Spans ranging from 50 to 400 F are available and can be utilized between the limits of -100 and 1000 F. Capillary tubing connects temperature bulb to transmitter. A block and clamp mounting arrangement secures the 7-lb instrument to any vertical or horizontal pipe or flat surface. Manufacturer says the instrument is weatherproof, can be installed in hazardous or corrosive outdoor areas. The Foxboro Co.

56—BARREL HOOK is handy all-position type

This utility tool has a sliding ring which can be locked between links. This feature lets the drum be lifted or tilted for emptying. Overall length of the hook is reduced from 47 to 42 in. providing for greater head-room when loading or unloading drums from storage racks. The hooks are made of a spark-resisting alloy. Their principal use is for handling drums of flammable or explosive materials, such as—paints, lacquers, thinners, high octane fuel, acetone, naphtha. Ampco Metal, Inc.

57—CONDENSER, air-cooled for air conditioning use

Designed to derive the maximum cooling effect from air, the Atmos-Therm Condenser is intended for air conditioning systems in localities in which the use of water is restricted or is costly. This air-cooled condenser uses no water. It changes the hot gas to a liquid ready for use at the expansion valve. This unit is a fin coil with copper tubes and aluminum fins and a weatherproof casing of



REMINGTON STUD DRIVER

saves up to 80% fastening costs on "special" jobs

Anchoring seats, bar stools to concrete

2" x 4" plates to concrete floor

Carpet gripper anchored to concrete

When it's an unusual fastening job that has to be done quickly, efficiently—let the Remington Stud Driver take over. There are special guards, interchangeable with the standard guard, that adapt it for practically any application. And the Stud Driver's cartridge-powered action enables one man to set up to 5 studs a minute—a saving in time and labor of approximately 80% over old-style methods.

Setup time is cut to a minimum with the Stud Driver. There are no holes to drill; no laborious hammering is necessary. A squeeze of the trigger and the tool's powerful cartridge drives the stud home—solidly and permanently into steel or concrete. Compact and portable, the Stud Driver has a field of use limited only by where a man can go.

DISCOVER FOR YOURSELF how this lightweight (6 lbs.) fastening tool can cut costs for you. Let us send you our new booklet which shows how the Remington Stud Driver anchors furring strips, structural channels and many other fabricated materials to concrete or steel. Just clip and mail the coupon for your free copy.

"If It's Remington—It's Right!"

Remington DUPONT

Listed & Approved by Underwriters' Laboratories, Inc.

MAIL THIS COUPON TODAY

Industrial Sales Div., Dept. P.E.-4
Remington Arms Company, Inc.
Bridgeport 2, Connecticut

Please send me a free copy of the new booklet showing how I can cut my fastening costs.

*Name*_____

*Position*_____

*Firm*_____

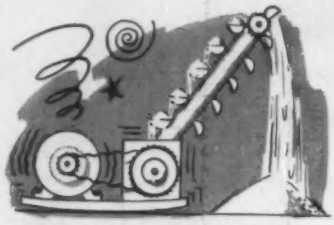
*Address*_____

*City*_____ *State*_____

For more facts circle 607 on Reply Card

4 ways to save money ... with Fluid Drive!

Whatever type powered equipment you are using . . . if the motors or engines are in the ¾ to 50 hp range, and the driven loads are heavy to start or present frequent running-load variations . . . you can convert to a "cushioned" fluid drive . . . reducing maintenance and downtime—and at less initial costs—by installing Twin Disc HYDRO-SHEAVE® Drives.



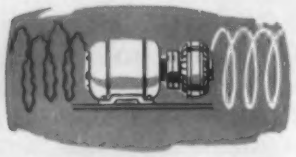
CUSHIONS LOAD-SHOCKS

by replacing mechanical drive with silken-smooth fluid-connection—absorbing vibrations, sudden jams, and variations in the load demand.

PREVENTS MOTOR BURN-OUTS

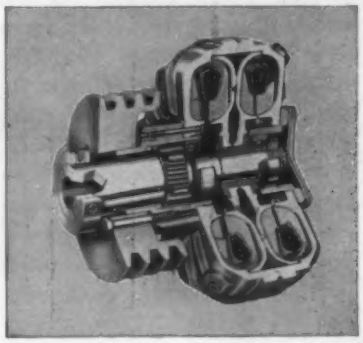
by providing fluid "slip" during heavy starts and load variations—eliminating current overloads and protecting motor from overheating and burning.

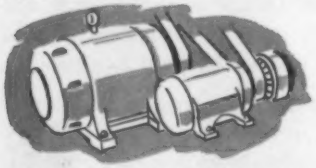
Slipped on the output shafts of motors and engines, HYDRO-SHEAVES are reducing costs on thousands of installations throughout industry. For information on the complete Fluid Coupling line for ¾ to 850 hp, see your Authorized Twin Disc Hydraulic Dealer—or write Twin Disc, Dept. DS, Racine, Wisc.



DELIVERS FULL TORQUE,

invariably equal to input torque, through fluid "slip" which permits motor or engine to make necessary speed adjustment to develop required torque.





PERMITS MOTOR SELECTION

on basis of running requirements, rather than starting requirements. On many installations, larger, high-torque motors can be replaced with smaller, normal-torque motors.

TWIN DISC CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC

Fluid Couplings

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin • HYDRAULIC DIVISION, Rockford, Illinois

Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Seattle • Tulsa

For more facts circle 608 on Reply Card

NEW PRODUCTS

(Begins on page 134)

heavy gage steel. Its construction is designed to eliminate vibration and promote quiet operation. All headers and return bends are protected and located in the air stream, it is pointed out and a de-superheat section in the coil promotes maximum heat transfer efficiency.

According to manufacturer, the unit is low in cost, and the installation cost is minor. It can be placed in the yard or on top of flat roofs. It is available in four models ranging from 2- to 7½-ton capacities. Rempe Co.

58—POWER TURN TABLES for many production uses

These power operated turn tables are adaptable to a wide range of assembly, finishing and inspection jobs. Turn table

and motor with speed reducer are mounted on a welded steel frame designed for loads to 1000 lb. Tables of steel, plywood or aluminum can be furnished to required diameter and height, and are available with constant or variable speed drive. Samuel Olson Mfg. Co.

59—ILLUMINATION KIT for those hard-to-see areas

Accuracy of production and inspection procedures is increased and work speeded and simplified by the G-S Syte-Ayde, says manufacturer; it provides light in out-of-the-way places. Powered by flashlight batteries, the unit provides four light transmitting rods. Two are straight, 3½ and 6 in. long, and two, of the same lengths, are bent 90 deg. Three 1½-powered mirrors, of ½-, ¾-, and 1¼-in. diam are supplied with clips which fit the rod ends. All parts are contained in a plastic kit which sells for less than $6.00. General Scientific Equipment Co.

60—RUST REMOVER is packaged in powder form

Transportation and handling costs of this rust remover are reported to be reduced as much as 75 per cent, because the water is added at the destination. The strength of the resulting liquid rust remover can be controlled to meet derusting or corrosion removing requirements for ferrous or non-ferrous metals. It is described as non-toxic, non-obnoxious, non-flammable,

SPECIALIZED CRANES to Fit SPECIALIZED HANDLING Situations

Through long years of experience, Bucyrus-Erie has developed specialized equipment for cranes which fit these machines to virtually every type of material, every specialized handling situation. Now, to meet your material handling needs most exactly, we are offering three types of 22-B machines.

STANDARD 22-B CRANE

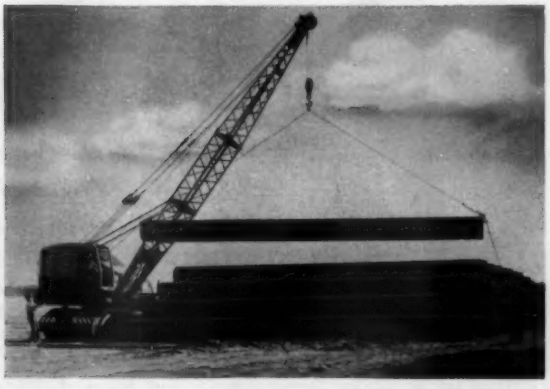
. . . shown here loading segment of 254-ft. laminated wood arch, the longest arch ever built of timber. Basic crane boom for this machine is 35 feet long, extendible to 70 feet by use of removable inserts. Crane ratings are variable depending upon length of boom, size of crawlers, and counterweight used.

HEAVY-DUTY 22-B CRANE

. . . shown here, carrying clamshell bucket and loading sand, is averaging 800 tons per 8-hour day. 35 foot crane boom on this machine is of heavier construction than the standard 22-B boom. Standard equipment on Heavy-Duty lifting cranes includes friction swing brake, power controlled lowering for main hoist line, long flat crawlers with 30" treads, telescopic pipe boom stops, and 8-part pendant-type boom suspension. Load capacities depend on size of crawler mounting, boom length, and counterweight.

22-B TRANSIT CRANE

. . . shown here stacking 30-inch welded steel pipe in lengths up to 40 feet, and averaging 40 truck loads daily. Each truck load consisted of five lengths of pipe. Transit Crane handles booms from 30 feet (standard) to 80 feet (with removable inserts) . . . has lifting capacity of 25 tons (nominal rating). Combines outstanding lifting crane features of heavy-duty machine with rubber-tired mobility. 125E55



For complete information on any or all of these models, see your nearby Bucyrus-Erie distributor. He's well qualified to advise you on how they can solve your handling problems.

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY

South Milwaukee, Wisconsin

For more facts circle 609 on Reply Card

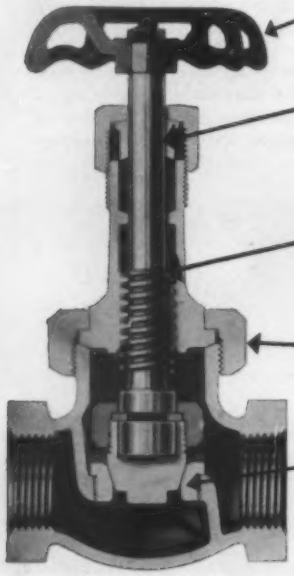
THE KENNEDY "500 BRINELL"

Bronze Globe and Angle Valves *with* Stainless Steel Seats and Discs

KENNEDY'S "500 Brinell" valves set a new quality standard in valve design, engineering and performance. New, rugged construction features cut your maintenance costs because KENNEDY'S "500 Brinell" valves give you longer service life on your toughest jobs. Specially-treated, super tough stainless steel seats and discs give you leakproof performance because they banish common valve enemies. Check these new built-in quality features and see why KENNEDY gives you the greatest valve value:

TWO DISC TYPES { FULLWAY PLUG TYPE } TWO PRESSURE RATINGS { 200 lbs. 300 lbs. }

Fig. 138S	200 lbs.	Fullway	Globe	¼" to 2"
Fig. 139S	200 lbs.	Fullway	Angle	¼" to 2"
Fig. 138PS	200 lbs.	Plug Type	Globe	¼" to 2"
Fig. 139PS	200 lbs.	Plug Type	Angle	¼" to 2"
Fig. 544S	300 lbs.	Fullway	Globe	½" to 3"
Fig. 546S	300 lbs.	Fullway	Angle	¼" to 3"
Fig. 544PS	300 lbs.	Plug Type	Globe	¼" to 3"
Fig. 546PS	300 lbs.	Plug Type	Angle	¼" to 3"



"PISTOL-GRIP" HANDWHEEL . . . Fits your hand, gives you a firm, easy 3-way grip on top, sides and bottom! Full palm protection, too.

KENALLOY STEM . . . A new, exclusive KENNEDY stem material that eliminates stem failures because it removes the cause of failures.

ACME THREAD Eliminates feather-edge ends which, in ordinary valves, can break off and lock stem in the bonnet.

UNION BONNET . . . A stronger, tighter joint that easily withstands pressure and pipe wrench punishment.

STAINLESS STEEL SEATS, DISCS "500 Brinell" hardness eliminates cutting by foreign objects, pitting, erosion, corrosion and wire-drawing.

• *FOR COMPLETE DETAILS WRITE FOR NEW BULLETIN 110*

THE KENNEDY VALVE MFG. CO.
1066 EAST WATER ST.
ELMIRA, NEW YORK
VALVES • PIPE FITTINGS • FIRE HYDRANTS

OFFICE-WAREHOUSES IN NEW YORK, CHICAGO, SAN FRANCISCO • SALES REPRESENTATIVES IN PRINCIPAL CITIES

For more facts circle 610 on Reply Card

NEW PRODUCTS

(Begins on page 134)

as leaving no alkalies and requiring no neutralizer. It leaves the derusted surfaces metallic clean with a thin rust-resistant coat, ready for paints, nickel or chromium plating, galvanizing and other protective coatings.

Its derusting action is fast. Rusted or corroded objects which can be submerged in a liquid bath require from 10 min to 3 hr at room temperature, says company, and when used as a hot bath, the action takes only 2 sec to 10 min. The solution is also reported effective for removing corrosion from aluminum, magnesium, copper, brass, bronze, stainless steel, etc. For vertical surfaces and large surfaces which cannot be submerged in a liquid bath a thickening agent is added to the solution. By-Buk Co.

61—DRIVE UNIT for monorail track system

Designed to propel a hoist or other type carrier on monorail track or crane bridge, this drive unit is announced as having duty-rated, life-time helical gearing. Traction is obtained by spring-loaded contact of the rubber wheel against the bottom of any smooth flange track. Speed ranges from 35 to 350 fpm, and power from ¼ to 2 hp. The drive can use any standard NEMA frame motor, and can apply any type motor brake. It features automatic adjustment for tire wear, manufacturer notes, and is available with fluid drive for cushioned start. It is claimed to meet requirements for constant service, exact delivery cycles, grade travel or the movement of loads to 5 tons, with power consumption and maintenance held to a minimum. The American MonoRail Co.

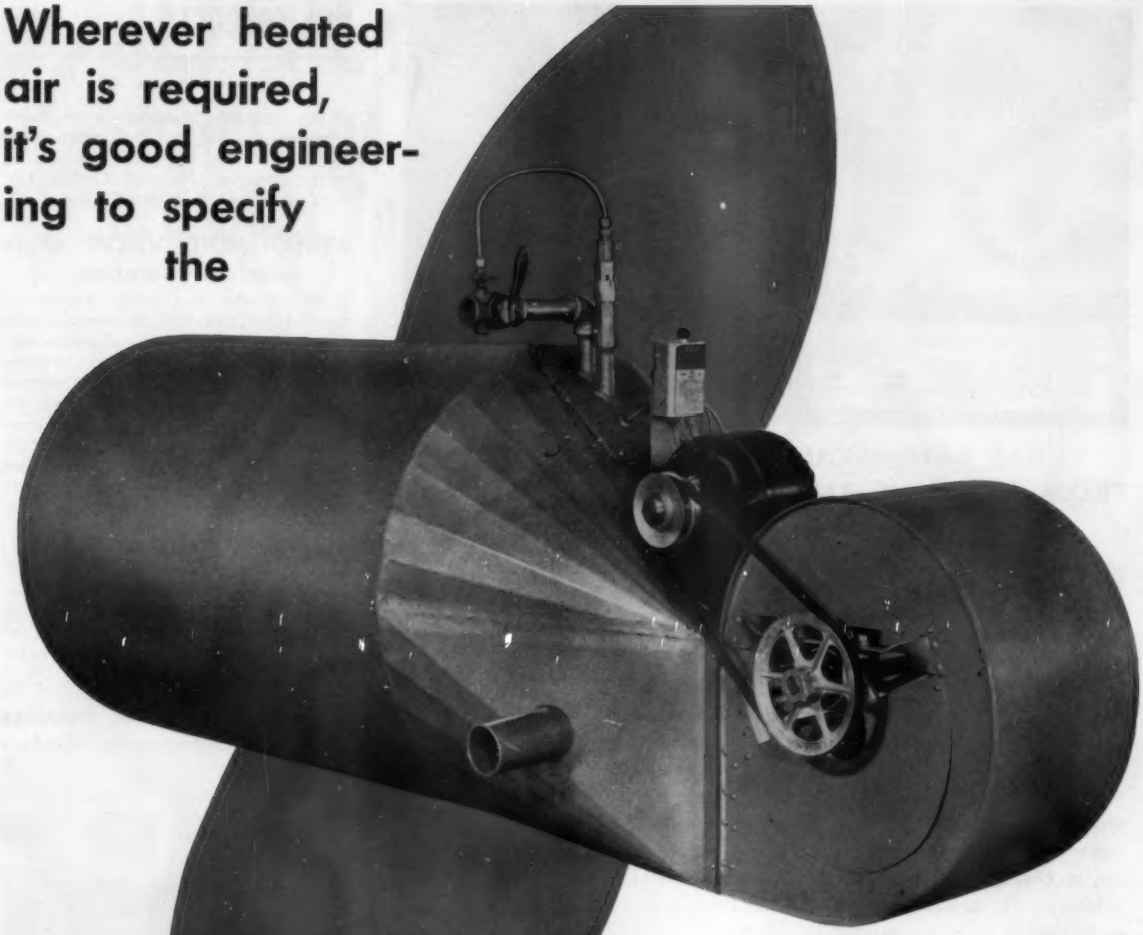
To receive product data circle item numbers on the handy Reader Service Cards provided on pages 213-214.

62—FLASHLIGHTS, heavy-duty industrial types

One of these new industrial flashlights, the Eveready Heavy-Duty, is announced as having an insulated ethyl cellulose case that won't shatter, crack or dent, is resistant to temperature extremes, and withstands deterioration from water, oils, greases, gasoline, alcohols and acids. The flashlight has a self-lubricating, hand-replaceable insulated slide switch and a polyethylene lens guard which throws a red warning light.

The Eveready Safety Flashlight is approved by the U. S. Bureau of Mines and listed by Underwriters' Laboratories, manufacturer states. It has the same features as the regular heavy-duty model, plus an extra lamp in the bottom cap. It is so designed that if the lamp is broken, the filament is snuffed out before

Wherever heated air is required, it's good engineering to specify the



John Zink Direct Fired Air Heater

Between-the-Tube BURNER

It is not necessary to form the tubes around the burner to secure maximum heating efficiency. Flame contact is equalized along all heating surfaces.

Furnished in groups of heads. Fires directly over stoker.

Recommended for the drying of lumber, ceramics, hardwood flooring and paint on toys; or dehydrating food products, feed, fertilizers, hay or tobacco.

The John Zink Gas-fired Air Heater is a complete unit ready for installation. Each unit is built to customer's specifications as to size and capacity.

The John Zink Air Heater will burn any natural, mixed, manufactured or LP gas.

Let John Zink and his engineers solve your commercial or industrial heated air requirements.

JOHN ZINK COMPANY

4401 So. Peoria Ave. Tulsa, Oklahoma

For more facts circle 611 on Reply Card

OCM can be used on almost any size engine. Requires little or no maintenance. Catalytic units last up to 2000-2500 hours — can then be easily and economically replaced.

KILLS DANGEROUS CARBON MONOXIDE FROM GASOLINE AND LP-POWERED EQUIPMENT

—Also Eliminates Hydrocarbons—

OCM CATALYTIC EXHAUST

Now you can operate lift trucks, bulk handling trucks, stationary engines — any type of gasoline- or LP gas-powered equipment — efficiently, safely, in even closely confined areas. For the OCM Catalytic Exhaust eliminates 95% or more of the deadly carbon monoxide, and 90% of the hydrocarbons, from the exhaust gases.

The OCM Catalytic Exhaust is made to replace standard engine mufflers. It's now available as optional factory-installed equipment from leading manufacturers, such as Buda, Clark, Yale & Towne, and Lincoln-Schlueter. Or it can be easily installed on present equipment by your own mechanics.

Wherever you operate gasoline- or LP gas-powered engines indoors — even part time — the OCM Catalytic Exhaust means an end to fume-caused headaches, eye irritation, and nausea. It means more efficient use of equipment, plus greater employee productivity and morale. Write now for complete information and the name of your nearest supplier.

FOR FORK TRUCKS

STATIONARY ENGINES

POWER SWEEPERS

OXY-CATALYST, INC.

WAYNE, PA., U.S.A.

MANUFACTURING • ENGINEERING • RESEARCH

Fume elimination processes and equipment for internal combustion engines — for incinerators — for consumer products — and for industrial air pollution control and heat recovery.

For Diesel Exhaust Fumes
New OCM Dieseler reduces below objectionable levels harmful, irritating exhausts from any 4-cycle diesel engine when running at or over 60% load. Write for details.

OXY-CATALYST, INC., Wayne 3, Pa.

Please send complete information on

- ☐ OCM Exhaust for gasoline engines
- ☐ OCM Dieseler for 4-cycle diesel engines
- ☐ Send name of nearest supplier

Name .....

Firm .....

Street .....

City ..... *Zone* ..... *State* .....

Inquirers in the U.S.A. or its territories, or in Canada, should write to Wayne, Pa. Inquirers elsewhere should write to Pan American Chemical Inc., 9 Rue La Perouse, Paris 16, France.

For more facts circle 612 on Reply Card

NEW PRODUCTS

(Begins on page 134)

it can ignite inflammable or explosive mixtures of gas in the surrounding atmosphere. Both lights come in two- or three-cell sizes. National Carbon Co., Div., Union Carbide and Carbon Corp.

63—SOLENOID VALVE offers noiseless operation

Quiet operation is a design feature announced for this new electro-pneumatic switch. Spring, armature and guide tolerance and material specifications are closely held to prevent alternating current hum, it is noted. When energized, the new valve passes full air at supply pressures up to 25 psi; when deenergized, the supply port is stopped and return line pressure wasted to atmosphere. A built-in manual adjustment permits valve opening when the coil is deenergized.

Port connections are ⅛ in. NPT and 60-cycle coils can be supplied for 115, 208, 230, or 440 v. Electrical leads, 12 in. long, come from a housing which can be rotated to facilitate wiring. Detailed information is in Bulletin 359. The Powers Regulator Co.

64—TRACTOR CAB provides increased operator comfort

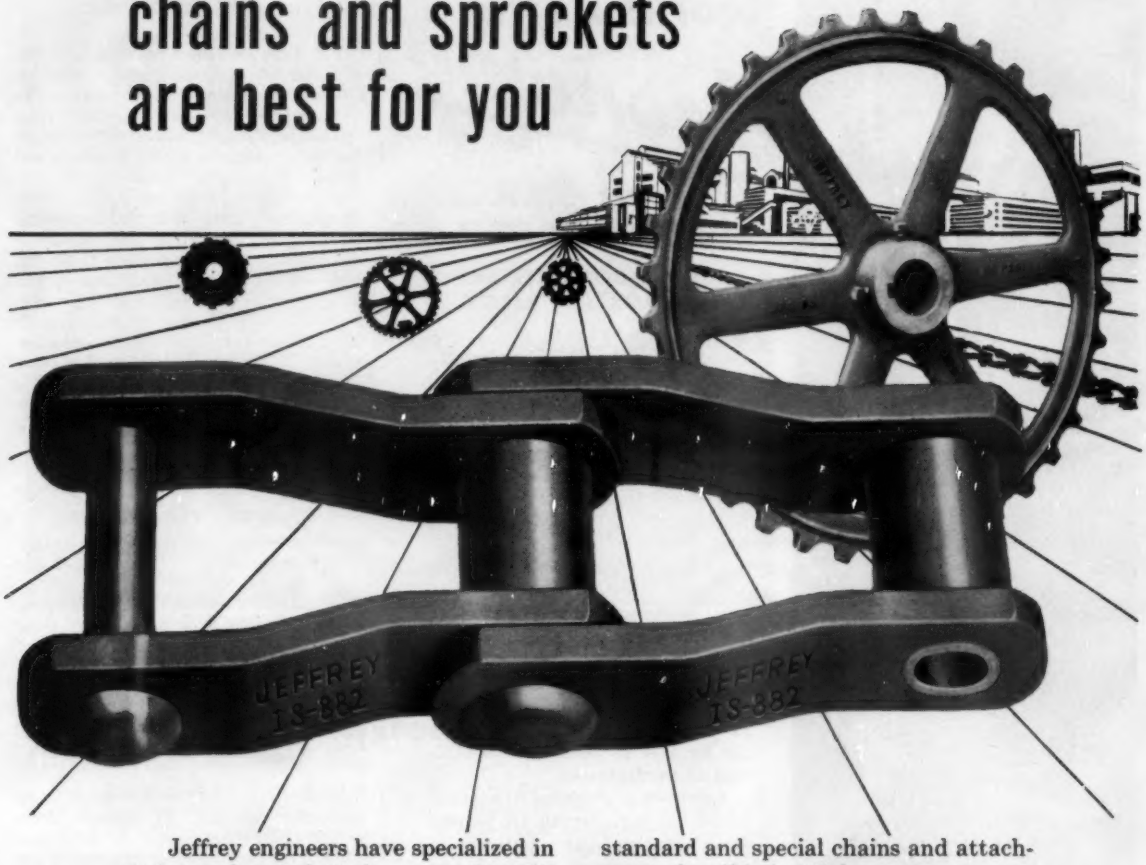
This all-weather low-cost cab is designed for company's Banty Model A-460, a gasoline tractor, newest prime mover in the Trackless Train line. The all-steel

body can be supplied for mounting on tractors already in use. Half-doors and canvas roll-down curtains enclose the cab and an electric windshield wiper and defroster system are provided to assure visibility during inclement weather. The windshield is of one-piece, shatter-proof glass construction. Attachments for the cab include head lights, tail lights and directional signals. Mercury Mfg. Co.

65—LIMIT SWITCH for machines, is heavy duty unit

Features claimed for the Type DM Machine Limit Switch include increased wiring space, protection against excessive overtravel achieved without shear pins, and separation of electrical and mechanical mechanisms. It is designed to offer greater ease in wiring and minimum maintenance. The switch is rated at 10 amp continuous capacity up to 600 v

JEFFREY
chains and sprockets are best for you



Jeffrey engineers have specialized in chains and sprockets for more than 60 years—keeping pace with industrial progress, but keeping original *quality standards* always the same.

Industries everywhere rely on Jeffrey for the best in Steel Thimble Roller drive chains . . . maximum strength at minimum weight . . . well-balanced design . . . exact fit and close tolerance giving full bearing contact without play or binding. Jeffrey also builds a complete line of standard and special chains and attachments for all industrial uses.

Jeffrey's wide range of sprocket wheels meets most industrial requirements. Accurate design and manufacture assure perfect molding, boring, facing and keyseating. Your Jeffrey sprocket wheels will fit your shafts, revolve true and give maximum service from the chain drive. Available in standard or special units—cast iron, cast steel, various alloys, flame-cut "STEEL CARVE", single or multiple width.

Write for technical literature.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

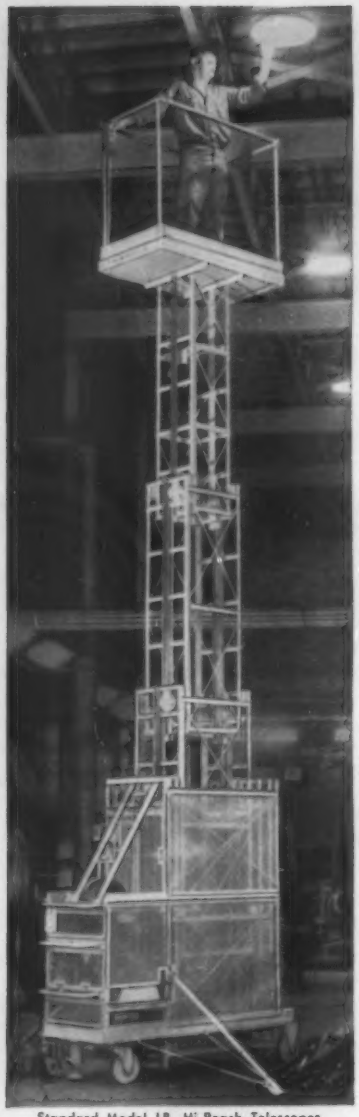
Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

Belt Idlers	Set Collars	Sprockets	Couplings
Pulleys	Takeups	Drive Chains	Holdbacks
Gears	Shafting	Pillow Blocks	Belt Cleaners

For more facts circle 613 on Reply Card



Standard Model LB, Hi-Reach Telescoper. Four heights 20 ft. to 35 ft.

A man who feels safe works better

Economy SINCE 1901

HI-REACH TELESCOPER

ENGINEERED FOR STRENGTH, STABILITY AND SAFETY

Safety is our first consideration in building Hi-Reach Telescopers.

For more than a quarter of a century our engineers have constantly improved the mechanical construction of Hi-Reach Telescopers to obtain maximum stability, smooth time-saving lifting action, and dependable performance.

Standard Models available from 10'-9" to 35 ft. high, and custom-built units as high as 100 ft. if you like.

If you have an overhead service problem or need a special material handling machine, Economy can build it. And you can be sure of complete satisfaction in performance.

Economy representatives, trained in engineering, are located in all principal cities. Call one in on your overhead servicing, or material handling problem. Estimates made without obligation.

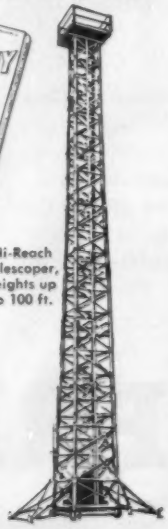
Write for new Catalog No. 55.

Forty pages of pictures and suggestions for special and standard machines.

Standard model PUL with extended platform for servicing over floor obstructions. Counter-balanced base.

Worklifter, battery powered

Standard Model PUL



Hi-Reach Telescoper, heights up to 100 ft.

ECONOMY ENGINEERING CO.

4527 W. Lake Street, Chicago 24, Ill.

New York Office, 342 Madison Ave., New York 17, N. Y.

For more facts circle 614 on Reply Card

NEW PRODUCTS

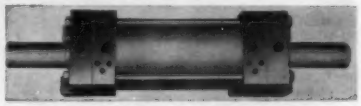
(Begins on page 134)

a-c, 550 v d-c, and is available with ½- or ¾-in. connectors.

The Type DM has a heavy diecast case with an integral solid wall separating mechanical and electrical mechanisms. On the electrical side, a heavy one-piece molded insulating chamber surrounds all live parts, supports wiring terminals and shrouds the moving contact arm to prevent fouling by wire leads. The inside of the front cover plate and separating wall are protected against arc deterioration by non-carbonizing glass melamine. It is pointed out that though the case is no larger than other switches of this type, ample space is provided for four No. 12 wires. The mechanical side is described as rugged, with a minimum of moving parts. Bearing surfaces in latch and trip mechanism are nylon-to-steel, and the operating arm roller is also nylon. Clark Controller Co.

66—AIR-OIL BOOSTER is automatically reciprocating

Believed by its manufacturer to be the first heavy-duty unit of its type offered in a double acting model is this continuous-action, automatically reciprocating air-hydraulic booster. It is claimed capable of delivering an unlimited amount of

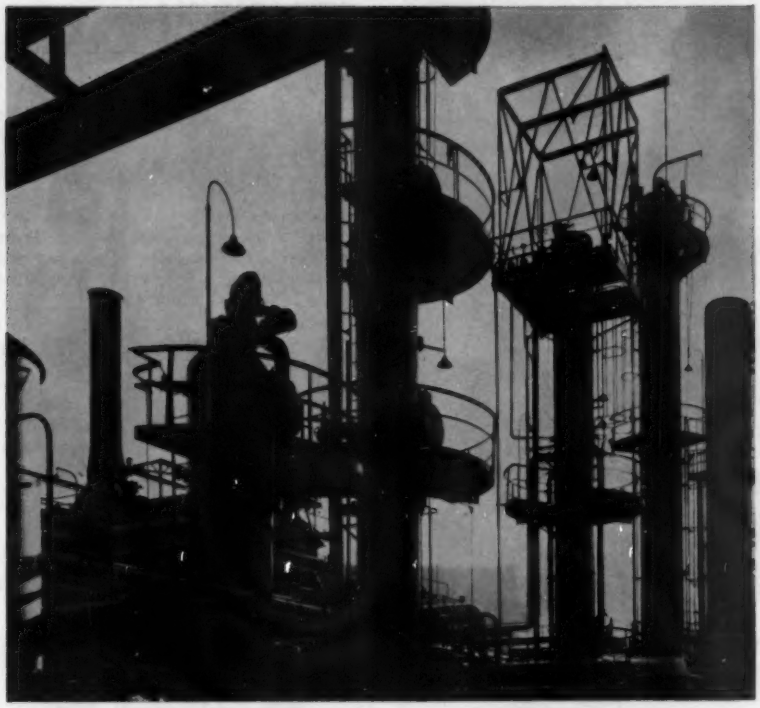


high pressure fluid for the operation of hydraulic cylinders. It operates from ordinary plant compressor air input and, while it does not build up its pressure nor discharge its oil as fast as the company's single acting B4 Boosters, the new unit offers operational advantages and cost-savings in applications where large volumes of high pressure fluid are required. Thus, it delivers a pressure output stroke in both directions. It is available in all ratios to give pressures to 10,000 psi and over. It is suggested for operations requiring high holding pressure without generating heat or wear and without consuming power. Miller Fluid Power Co.

67—CONTROL VALVES are temperature actuated

Designed to control the flow of water, brine, oil, air, gas or other fluids, the Type WT Valve opens with a rise in temperature and closes with a drop in temperature. It comes in direct-operated sizes of ⅜, ½ and ¾ in. FPT, and in seven pilot operated sizes from 1 to 4 in. Five standard temperature ranges are from 20 to 60 F to 160 to 220 F. The liquid pressure range is 150 lb, steam limited to 15 lb.

To control the flow of hot water or low pressure steam used in heating or other industrial processes, the Type HT Valve closes with a rise in temperature



A section of the new Shell Chemical Corporation plant at Ventura, California. Product: liquid ammonia (NH_3), chiefly for soil fertilization, made by reacting nitrogen from air with hydrogen from natural gas.

How Rome Synthinol® Helps Solve Heat and Corrosion Problems

Some 16,000 feet of Rome Synthinol, color-coded for circuit identification, are doing a job at Shell Chemical's new Ventura (Calif.) petrochemicals plant.

Like most chemical plants, and many other industrial operations, this Shell plant runs 24 hours a day all year round. And while electrical cable may not be the "star performer" at Ventura, like other component equipment it has a vital role in a round-the-clock type of operation.

Dependability, therefore, is a *must* and the use of Rome Synthinol is an example of how Shell has met the "must" for heat and corrosion resistance. Rome Synthinol polyvinyl chloride insulation securely protects electrical wiring against high temperatures and corrosive chemical conditions. It is National Electric Code approved as Type TW.

Over 18 Miles of Other Cables

Specifically engineered Rome products are performing other significant jobs for Shell at Ventura.

. . . there's *RoZone-RoPrene* cable with its all-resistant properties—for example, the high ozone resistance of the *RoZone* oil-base insulation. Also there is *RoMarine-RoPrene*, specified for heat and moisture resistance. The RoPrene (Neoprene) sheath, common to both these cables, provides rugged mechanical protection.

. . . and there are more thousands of feet of Rome quality braided building wires, also color-coded for ready identification in multiple circuits.

Personalized Engineering Help

Whether your wire and cable problems are unusual, extra tough, or ordinary—whether your project is modernization, expansion, or brand new facilities, Rome Cable can help you, too.

Write today for information on YOUR wire and cable requirements. Personalized Rome engineering help is available coast-to-coast, when YOU need it.

It costs less to buy the best

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TORRANCE · CALIFORNIA

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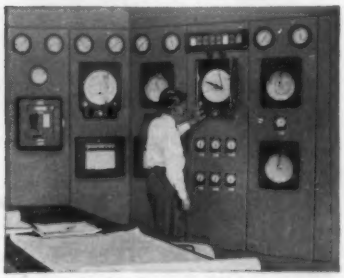
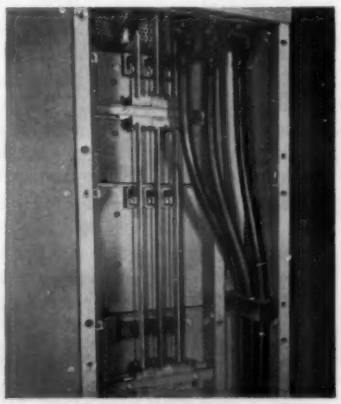
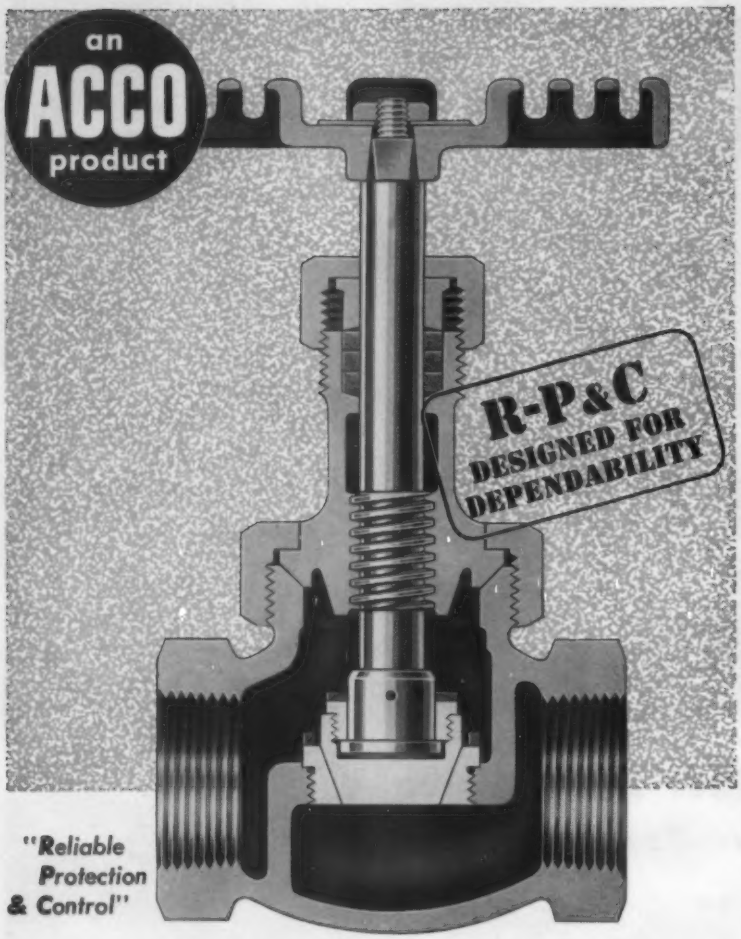
Modern lathes in the machine shop maintain the efficiency of precision plant equipment.



Part of an instrument board controlling intricate processes in gas reforming and purification sections.



One of many neat installations readily made with Rome cables such as RoZone-RoPrene, RoMarine-RoPrene and Rome Synthinol.



New R-P&C Bronze Globe Valve

—STAINLESS STEEL SEAT AND DISC (500 BRINELL)
—FULL-PLUG FOR CLOSER REGULATION, LONGER LIFE

R-P&C's new **Fig. 427-DP** bronze globe valve is recommended for steam, water, oil and gas service where control or regulation of flow is required. Its 500 Brinell stainless steel seat and disc resist wire-drawing—make it particularly suitable for continuous throttling and other severe applications.

• The Fig. 427-DP is packed with the quality features that users expect from R-P&C. For example, the union bonnet for added strength and convenience, and a disc and seat ring construction which permits regrinding without removing the valve from the line. The full-plug construction, with its exceptional wide seating surface, gives closer control, longer life.

• The Fig. 427-DP is rated for 300 lbs. Steam—1000 lbs. OWG in sizes ¼" to 2", and 600 OWG in sizes 2½" and 3". Also supplied as an angle valve. Precisely designed, it is a fitting addition to R-P&C's complete line of bronze valves—gates, globes, angles and checks, in pressure classes from 125 to 300 lbs. See your R-P&C Distributor or write for catalog.

ACCO

R-P&C Valve Division
AMERICAN CHAIN & CABLE

Reading, Pa., Atlanta, Boston, Chicago, Denver, Detroit, Houston, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

R-P&C valves

For more facts circle 616 on Reply Card

NEW PRODUCTS

(Begins on page 134)

and opens with a fall in temperature. Its main application is in heat-exchangers and in heating; but it may also be used as a by-pass control in cooling and process service. Temperature and fluid pressure ranges are the same as in the WT Valve. Connection sizes in the direct operated type are also the same, and there are four pilot operated sizes from 1 to 2 in. Electrimatic Co.

68—SELF-PROPELLED LIFTER for light duty jobs

The Walkie-Worklifter has a lifting capacity of 1000 lb and is designed for light and medium duty service. It is available

in many models including a straddle base type, with a lifting range of 108 in. Standard platform models are made with lifting ranges to 110 in. The 60 in. lift standard platform model is available at the price of approximately $1,150.00. Economy Engineering Co.

It's easy to obtain product data with the postage-free Reader Service Cards provided on pages 213-214. Use them for information on advertised products, too. Just circle the key number appearing at bottom of the ad.

69—PANELBOARDS are quick-make, break type

An outstanding advantage of this new line of quick-make, quick-break plug-in fusible distribution panelboards is availability. Standardized components of the OMB Saflex line can be stocked by distributors for immediate delivery on any job requirement, says manufacturer. Plug-in components include both main and branch circuits as large as 200 amp, either 250 or 600 v.

The 30-, 60-, 100- and 200-amp units, two and three pole, 250 or 600 v are equipped with plug-in stabs and are plugged onto round bus bars. The larger 400- and 600-amp units are bolted to flat bus bars and are available in factory

Here's the lowest cost

TRAMP METAL PROTECTION

ever offered...

...It's the New

DINGS

"Universal Series" METAL DETECTOR

The new Dings Universal Series Metal Detector will detect the presence of all magnetic metals in materials that pass through the Detector Search Coil. Metals are thus detected in material in any form, whether in raw or finished conditions, in bulk or pressed form, liquid or viscous, granular or fibrous state. Even weakly magnetic metals such as manganese steel can be detected by this new, adjustable intensity unit.

Extremely simple in design, installation and operation, the new Dings Metal Detector requires virtually no attention. It is merely necessary to plug the unit into any single phase outlet, place the Search Coil around conveyor belt, and turn on the switch . . . and you have provided protection against tramp metal damage to machinery and product quality at an extremely low cost.

DINGS ELECTRONICS, INC.
(subsidiary of DINGS MAGNETIC SEPARATOR CO.)
4766 W. Electric Ave., Milwaukee 46, Wisconsin

HERE ARE SOME OF ITS OUTSTANDING FEATURES

- Wide range of sensitivity settings
- Responds to manganese steel
- Remote location of control cabinet (30-ft. of cable furnished)
- Permanent stability (no adjustments necessary — not subject to temperature or humidity changes)
- Rubber-mounted search coil completely water-tight
- Control relay inside cabinet (for actuating alarm systems, reject devices, motor starters, etc.)
- Low power consumption
- Easily installed and operated, even by inexperienced personnel

Dings

Magnetic Separation Leader for over 50 years

MAIL THIS COUPON NOW

DINGS ELECTRONICS, INC.
4766 W. Electric Ave., Milwaukee 46, Wisconsin

Please rush further details about the new Dings Universal Series Metal Detector.

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Company_____

Address_____

City_____ Zone____ State_____

MD155

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cut your field erection costs with complete hanger units

A sure way to cut your field erection costs is to use Blaw-Knox hangers and eliminators. Each is a complete packaged unit, ready to install. No expensive cutting, threading and assembling on the job.

In addition, these packaged units will cut your engineering and specifying time.

Each Blaw-Knox functional spring hanger, constant support spring hanger, rigid hanger assembly, overhead roller assembly, and vibration eliminator is designed for a specific purpose. Constructed to conform with the "code for pressure piping." Available in types and sizes to meet varying conditions.

Whenever you'd like some help, our experienced engineers are available to both design and make recommendations for your hanger requirements.

BLAW-KNOX COMPANY
Power Piping and Sprinkler Division
Pittsburgh 33, Pennsylvania

To get complete information, send for your copy of Bulletin 54.

BLAW-KNOX **PIPE HANGERS**

Complete line of functional spring hangers • constant support spring hangers • rigid hanger assemblies • overhead roller assemblies • supports • vibration eliminators . . . plus complete prefabricated piping systems for all pressures and temperatures

For more facts circle 618 on Reply Card

NEW PRODUCTS

(Begins on page 134)

assembled panels. The units and solid neutral may be added, interchanged or removed, providing a flexible panel. All

units are dual horsepower rated for standard and time delay fuses. They also have a safety interlock incorporated in the cover. Factory assembled panelboards are available with 200 through 1200-amp mains, may be had with or without cabinet doors. QMB Saflex Bulletin SD-29 gives data. Square D Co.

70—MACHINE straightens and cuts small wire

Short lengths of wire from 1 to 12 in. long and up to ⅛ in. diam are straightened and cut to size by the No. 7 Wire Machine. This machine can be hand operated for small quantities of wire, or belt or

motor driven for increased production. A graduated scale simplifies adjustment to produce desired length of wire. Wire on reel adjustable to any size coil is fed through the machine by a reciprocating feed clutch and is automatically straightened and cut to length. This machine is described as simple to set up, easy to operate, and highly versatile in application. The Lewis Machine Co.

71—PUMP, compressor/vacuum, is water cooled

Two-stage 100-lb rotary air compressor/vacuum pumps are announced for shop air systems, pneumatic conveyors, gas compression, and similar applications. Water cooled, the compressor/vacuum pump consists of a separate low pressure unit coupled to a high pressure unit, mounted on a common bed plate. It is designed for direct connection to motors; although it may be driven through speed decreasing or increasing gears by motors, engines or turbines. While of nominal 100-lb capacity, the unit is available in eight sizes to handle from

6 STAR FEATURES

years ahead!

A VERTICAL SPLIT CASE PUMP

B & G SERIES 1510

TYPE B CENTRIFUGAL PUMP

. . . with balanced loading of impeller and bearings . . . handles loads far in excess of those produced by any pump and motor combination! Easily serviced without breaking pipe connections!

1. **Leak-proof Mechanical Seal.** Features the exclusive, harder-than-glass B & G "Remite" insert. This Seal construction has enabled nearly two million B & G Pumps to make an amazing record for failure-proof performance.

2. **Hydraulically Balanced Impeller.** Balancing chamber and pressure relief holes in the impeller reduce thrust to a minimum, lengthening pump life.

3. **Solid-type Volute with Support Foot.** Can be left in pipe line when servicing pump—rugged construction absorbs piping strains.

4. **Removable Bearing Frame.** Complete bearing frame, including seal and impeller, can be removed without disturbing piping or motor leads. The bearing frame is replaceable and interchangeable on all sizes.

5. **Anti-Friction Roller Bearings.** Timken Bearings handle thrust and radial loads for smoother, quieter, more efficient operation.

6. **Oil Lubrication.** No messy, undependable grease cups—circulating oil lubrication assures positive protection to bearings. Oil level indicator permits visual check.

STOCK PUMPS!

Selected sizes of B & G Series 1522 and 1531 Centrifugal Pumps are stocked at the factory for immediate shipment. Capacities to 225 GPM, heads to 140 ft. Send for Price and Selection Catalog.

BELL & GOSSETT
COMPANY
Dept. DV-53, Morton Grove, Ill.
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If you **ever plan** to **move** any **machinery...**

you need this
BARRYMOUNT® BULLETIN

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It tells how you can reduce noise and protect the accuracy of your precision machines and instruments by isolating building-borne vibration with this modern machinery mounting.

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WATERTOWN 72, MASS.

SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

For more facts circle 620 on Reply Card

NEW PRODUCTS

(Begins on page 134)

approximately 250 cfm to 1800 cfm and for pressures ranging from 60 to 125 lb. Allis-Chalmers Mfg. Co.

72—CABLE CONSTRUCTION for hot locations

Okotherm, an insulated, aluminum-sheathed cable is designed for continuous operation at 150 C and up to 200 C under certain conditions. Available for both power and control cable circuits, the cable is said to provide labor-saving advantages through its own built-in aluminum conduit. The chief advantages announced are: flame and heat resistance; no conduits and related problems; moisture and ozone resistance; small diameter; light weight; high dielectric strength; and corrosion resistance. Other data provided in Bulletin 1088. The Okonite Co.

73—THERMOPILOT RELAY shuts off gas-fired units

Automatic reset and stable operation are features announced for the A-100R Thermopilot Relay for automatic safety shut-off. Any tendency to chatter because of vibration is claimed to be eliminated by a pilot generator which supplies 10 times the voltage of many single thermocouples of the same physical size. Current generated by this pilot generator closes the electrical relay switch. It is explained that when the pilot flame is extinguished or an unsafe low pilot condition exists, the relay breaks contact to shut off the main control valve. When the unsafe condition is corrected, relay contact is automatic, says manufacturer; no manual reset is required and a slight variation in pilot flame does not result in a false dropout.

The relay is available with either two- or three-wire connections. The former, with relay normally open, is for pilot flame safety on furnaces, ovens, boilers and similar gas-fired equipment. The three-wire units, with their single-pole, double-throw action, can be used in alarm circuits and in electric ignition circuits. General Controls Co.

74—ZEOLITE BYPASS controls degree of hardness

At times, it is necessary to treat water to produce a controlled degree of hardness rather than complete softness. Developed to meet such a need, this zeolite bypass serves to control the proportionate mixing of untreated hard water and treated, fully-softened water to produce whatever degree of hardness desired.

Operation is described as simple. A single setting (on the adjustable orifice) regulates the ratio of hard to soft water, it is noted; the valves are automatic and adjust to flow variations of one to four, without perceptible loss of accuracy. There are no pumps and few moving parts. This simplicity keeps costs down for installation, operation and mainte-

Specify these values for

PRODUCTION LIGHTING

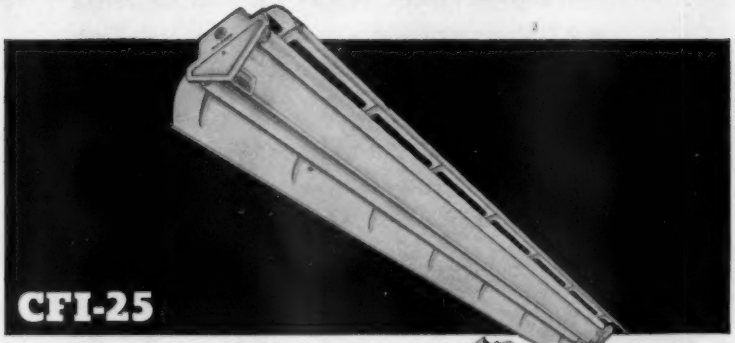
Authorities agree that uncomfortable lighting is a cause of nervous and muscular tension. That's one reason why *lighting comfort* is of such vital importance to everyone, everywhere!

Realizing this, Day-Brite illuminating engineers "have done something about it." Mainly, their studies centered on the reduction of the uncomfortable and distressing effects of *light contrasts*. The result is a new concept in comfort lighting — the Day-Brite CFI (comfort for industry) series, described below.

These new fixtures utilize the principle of upward lighting to "wash out" eye-shock effects of ceiling contrasts.

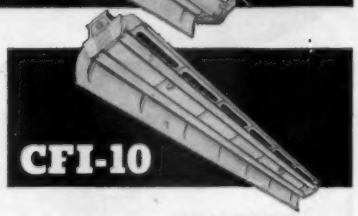
NEW DAY-BRITE CFI FIXTURES

There are two new "comfort-for-industry" Day-Brite lighting fixtures — the CFI-10 and CFI-25. Both are engineered to meet any comfort specification dictated by factors surrounding the installation.



with 25% upward component

Two-lamp fixtures available for 8-ft. Slimline lamps and for 4-ft. Rapid-Start lamps. Also available for use with the newly developed 8-ft. High-Output Rapid-Start lamps. All-steel, reinforced construction is used throughout, including reinforced die-embossed ribbing to insure greater reflector rigidity. Reflectors are one-piece all porcelain enamel, the LIFETIME FINISH. The truss-like channel features a ribbed top section, so that sliding clamp hangers may be positioned anywhere along the run.



with 10% upward component

For two and three lamps. Engineered to provide a 10% upward lighting component, the CFI-10 is in all other respects similar to CFI-25.

5429

"DECIDEDLY BETTER" DAY-BRITE *Lighting Fixtures*

SEE! EXAMINE! COMPARE! Then specify Day-Brite fixtures — their many superiorities are self-evident!

CALL YOUR DAY-BRITE REPRESENTATIVE...SEND FOR BULLETINS DESCRIBING THE CFI-10 and CFI-25.

Day-Brite Lighting, Inc., 5439 Bulwer Avenue, St. Louis 7, Missouri.

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING EQUIPMENT

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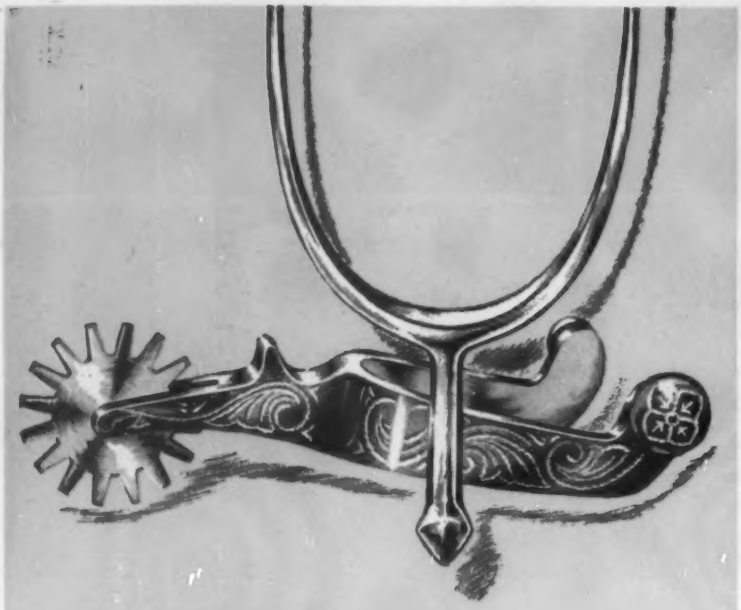


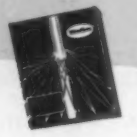
Choose one . . .

You can see at once that these spurs differ; serve different need. Suppliers differ. Titeflex was born and raised on a custom-engineering way of doing business. Fresh thinking comes naturally to them. Titeflex people like to tackle the tough ones.

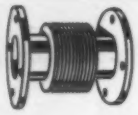
When you buy any Titeflex product you get something extra for your money—Titeflex interest in you. Take time to learn the difference. Send the coupon along today.

Titeflex

☐ Seamed and Seamless Metal Hose



☐ Ignition Harness and Shielding



☐ Precision Bellows

☐ Quick-Seal Coupling

TITEFLEX, INC.
Industrial Products Division, 536 Hendee Street, Springfield, Mass.

Please send me without cost information about the Titeflex products checked above.

Name_____

Title_____

Firm_____

Address_____

City_____ Zone_____ State_____

Left—Western spur with 16-point rowel Right—English spur with straight rowel

For more facts circle 622 on Reply Card

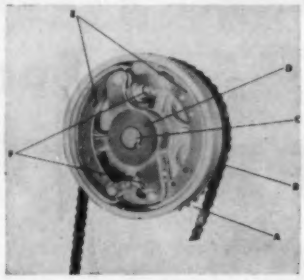
NEW PRODUCTS

(Begins on page 134)

nance, manufacturer points out, and assures maximum dependability. Bypassing the zeolite softener is said to extend softening cycles and produces savings in operation and resin costs. The bypass may be applied in controlled-scale corrosion prevention; municipal water supply; and wherever it is preferable to use simple zeolite softening without producing a zero-hardness water. Graver Water Conditioning Co.

75—FRICTION CLUTCH is an improved machine drive

Developed for use on manufacturer's washing, pickling, drying and phosphatizing machines, this safety friction clutch is now being offered for use in other machine designs. As illustrated, drive sprocket (A) is bolted to drum (B) and



the complete assembly of drum and sprocket floats on driven shaft (C). The spider (D) is fastened to the shaft by a key. Brake shoes (E) are pivoted at one end to the spider. At the opposite end of each shoe, the adjustment clevis (F) holds the shoe in place and is threaded and equipped with nut, washer and spring. Power is transmitted through a roller chain to the sprocket through the brake shoes and the spider to the driven shaft. A slight adjustment of the nuts on the adjustment clevises gives sufficient pressure against the drum to carry extremely heavy loads, it is explained; and regardless of the load, the slightest overload will cause the clutch to slip until the obstruction is removed. Metalwash Machinery Corp.

76—ALUMINUM PAINT is one-coat anti-rust finish

Rust-Cure XX Aluminum is reputed to provide a substantially brighter finish, while eliminating the possibility of fading or "darkening." According to manufacturer, this paint is made of doubly pigmented aluminum mixed with a colorless base vehicle, and the latter does away with bleeding problems associated with many paints.

For indoor or outdoor use, Rust-Cure XX Aluminum is declared especially well adapted for roller applications on wire fences. The paint can be applied with minimum surface preparation and without wire brushing, scraping or sand-

NEW PRODUCTS

(Begins on page 134)

blasting, it is pointed out, and when painted on rusty metal, it penetrates into the surface and seals against further rust action. It can be applied by brush, spray or roller Bulletin 136-11 gives details. The Monroe Co., Inc.

77—MASONRY ANCHOR, one-piece aluminum alloy

What is described as the first easy-to-use fastener for anchoring into masonry, cinder block, and concrete is this one-piece aluminum alloy hammer drive unit. It permits perfect alignment in any drilled hole, says manufacturer, and because of the one-piece construction there is nothing to come apart. Quicker, easier fastening is claimed for the fastener because it requires a smaller hole with less drilling. The galvanized nail which comes with the aluminum shield has knurling to increase holding power. Packaged 25 to a box, the anchors come in 13 sizes from 3/16 by ⅞ to ½ by 3½. Diamond Expansion Bolt Co.

78—MECHANICAL PACKING for liquid caustics

Designed exclusively for liquid caustics, White-Lon Style 322 Mechanical Packing is claimed to be ideal for use on stainless steel or chrome plated pump shafts to form a tight seal against such strong alkalies as sodium, potassum, barium, ammonium or magnesium hydrozides. A method of treating individual strands of Chrysolite Canadian Asbestos with Teflon Suspensoid is utilized to immunize the packing against alkalies and prevent seizing or scoring of shafts. A. W. Chesterton Co.

79—SOUND MUFFLERS screen out high-frequency noise

Straightaway Sound Protectors are designed to prevent the harmful effects of loud noise—to screen out loud, high-frequency noises while permitting voices to be audible to the wearer. Straightaway Sound Protectors muffle the ears and the adjacent bony structure which also transmits sound, it is pointed out; nothing enters the ear. Soft vinyl foam pads are held on externally, fit snugly and conform to ear contours. There are both helmet and headband models; some have earphones which connect to communications systems. American Optical Co.

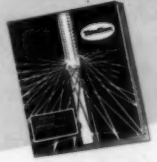
80—UTILITY GRINDER is handy and budget priced

Principal applications of the Model 648 Abrasive Belt Grinder include free-hand work such as flat surfacing, squaring, rounding, deburring, chamfering, and polishing metals, wood, glass and plastics. It is announced as especially suited to job shops, tool rooms, maintenance and repair departments. Priced at $165.00, this

...to handle vibration, temperature and corrosion headaches in conveying applications

Do you have to conduct water, solutions, fuel, lubricants, oxygen or other gases or liquids between two points which may not remain fixed? Your answer is Titeflex flexible metal hose.

Titeflex offers you just about everything you could wish for in metal hose—seamed or seamless, braided or unbraided, a wide choice of alloys and fittings. And Titeflex has the originality and experience to simplify your design difficulties—the laboratory control and development engineering assistance you want behind you. All you have to do is send your drawing; we fill in the exact hose type required. ***Telephone or mail in the coupon for full information about metal hose and its uses, catalog 4200.***



Titeflex

FLEXIBLE METAL HOSE

TITEFLEX, INC.
Industrial Products Division
536 Hendee Street
Springfield, Mass.

Your knowledge of metal hose applications may be helpful to us.
Please send your complete catalog—without obligation.

Name_____

Title_____

Firm_____

Address_____

City_____ **Zone**_____ **State**_____

For more facts circle 623 on Reply Card

COTTON TOWELS* for operating economy at Monongahela Power

*Fairfax Towels used by Monongahela Power Company are supplied by Mountain State Linen Service, Clarksburg, West Virginia.

• It calls for men, money, and materials to bring electric power to the large, heavily industrialized area served by Monongahela Power Company. It calls for a modern, fully equipped headquarters, too—like this one at Fairmont, West Virginia—to serve as nerve center.

Fairfax cotton towels fit this modern picture. Wise management knows *by experience* that soft cotton towels absorb better, wipe faster, mean real operating economy. You are spared inventory and storage headaches. Your restrooms are clean and uncluttered. You cut down on plumbing repair bills. Cotton is kinder to skin—gives *cleaner* clean-up—boosts employee morale.

So take this tip from industrialists everywhere—give the towel job to cotton in your office building, plant, or institution. Write for free booklet which explains how cotton towel service will help you. The address: Fairfax, Dept. P, 65 Worth St., New York 13, N. Y.

Here's How Linen Supply Works...

You buy nothing... your linen supply dealer supplies everything. The low cost includes cabinets, pickup and delivery, provides automatic supply of freshly laundered towels and uniforms. Quantities can be increased or decreased on short notice. Local service is listed in your classified book under LINEN SUPPLY or TOWEL SUPPLY.

Clean Cotton Towels...

Sure Sign of Good Management

Fairfax Towels

A PRODUCT OF WEST POINT MANUFACTURING CO.
WELLINGTON SEARS CO., SELLING AGENTS, 65 WORTH STREET, NEW YORK 13

For more facts circle 624 on Reply Card

NEW PRODUCTS

(Begins on page 134)

grinder also offers a low cost way for companies to do pilot work with abrasive-belt grinding on operations in their own plants.

The grinder is quickly adjustable to verticle or horizonatal position (or to any intervening angle). Its 6-in. belt is backed by a 6⅜ by 14⅛ in. platen and will handle fairly large as well as small pieces. The work table is adjustable and is slotted for an adjustable angle gage calibrated for any angle up to 90 deg. Drive units are optional and include 1 hp, 60-cycle motors in single phase at 110/220 v, or in triple phase at 220/440. Belt speeds of 2800 and 4000 sfpm are available with a 1725 rpm motor. The Engelberg Huller Co., Inc.

81—REPAIR MATERIAL for conveyor belts, cables

Rema is announced as a self-vulcanizing rubber repair material for repairing rubber conveyor belts and rubber covered electrical cable. It is explained that the abrasive resistant cover stock and rubber filler self-vulcanize by a chemical process. Repairs can be made quickly and the belt put back into operation immediately, says company, and neither heat nor heavy equipment is necessary. Flexible Steel Lacing Co.

82—WELDING TOOL is light, easily operated

No special skill is required for operation of the Handy-Giant Welder, says manufacturer of this lightweight versatile tool. It uses only 6 v, operates on 115-v

60-cycle a-c. According to company, it is durable, powerful and safe, and no glasses are needed when using it. The tool is suggested for quick welding, brazing, soldering; it may also be used to etch and cut holes in metal. Its shipping weight is 12 lb; it will sell for around $50.00. Cauhorn Mfg. Co.

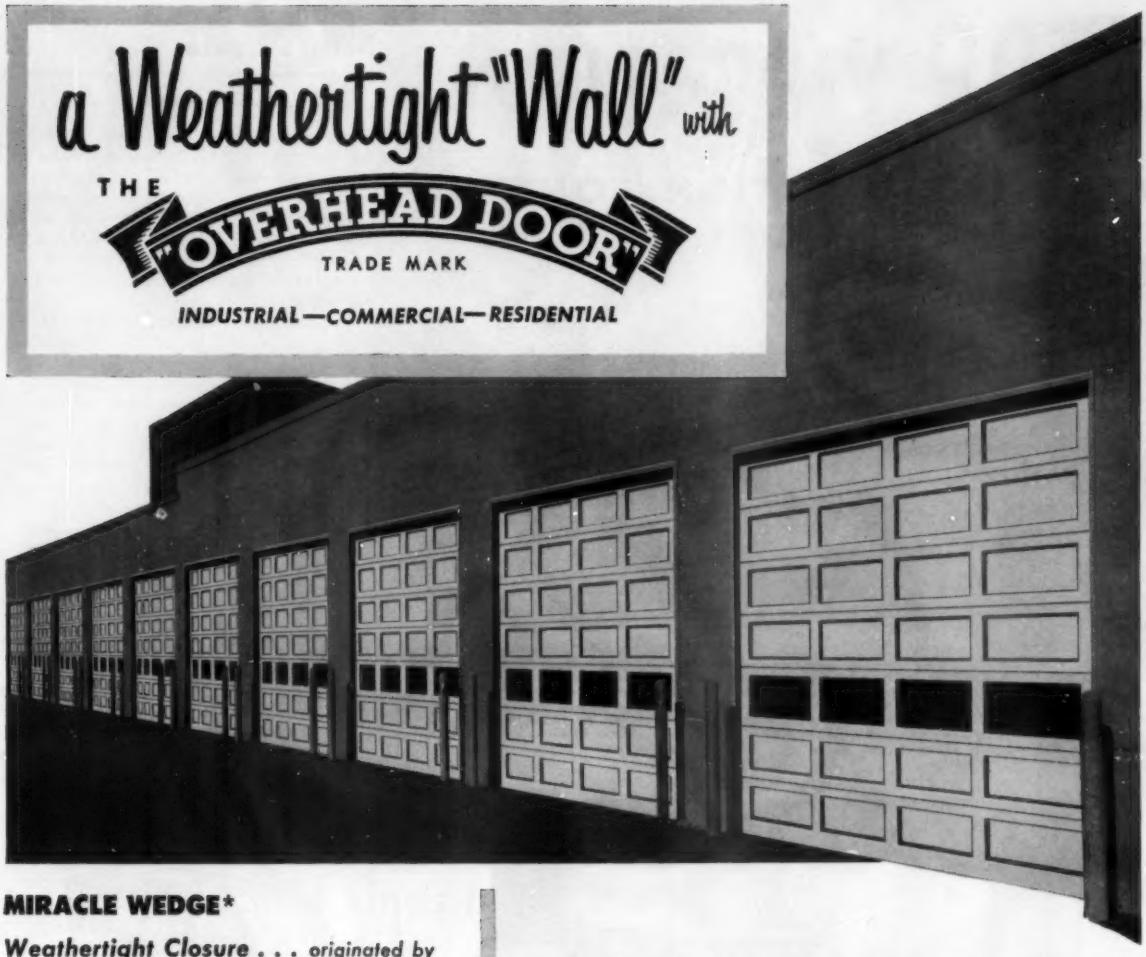
83—PROTECTIVE FINISH for building exteriors

Hydrocide Colorcoat is described as an oil-base product using silicon compounds. It is designed for use on brick, masonry, cement block, cast stone or asbestos shingles. One coat is said to provide a water-repellent surface even for such

a Weathertight "Wall" with

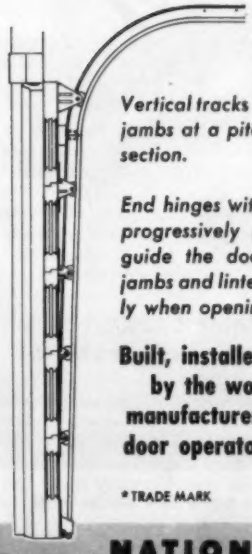
THE "OVERHEAD DOOR"
TRADE MARK

INDUSTRIAL—COMMERCIAL—RESIDENTIAL



MIRACLE WEDGE*

***Weathertight Closure** . . . originated by Overhead Door Corporation in 1921, this feature is the basis of construction of every door, from the smallest residential garage door to the largest industrial door.*



Vertical tracks incline away from jambs at a pitch of ¼" per door section.

End hinges with roller sleeves of progressively graduated height guide the door tightly against jambs and lintel, yet free it quickly when opening.

Built, installed and serviced by the world's largest manufacturer of doors and door operators exclusively!

*TRADE MARK

For easy solution of heating problems, employee protection, traffic speed-up and lasting satisfaction under constant hard use, insist upon The "OVERHEAD DOOR," first and finest in its field. This quality door is built of wood, steel or aluminum in any size to fit the opening . . . a "custom" door at production line prices. Consult our engineering and research staff about unusual installation problems.

Equip All Doors with

ELECTRIC OPERATORS

and Remote Control

Electric operation from a centralized control board pays for itself in man-hours saved. It lengthens the life of the doors because they move at a steady speed proper for their size and weight, without sudden strains.

OVERHEAD DOOR CORPORATION

Hartford City, Indiana

America's Great Name in QUALITY DOORS...

MANUFACTURING DIVISIONS:
HILLSIDE, N.J. CORTLAND, N.Y.
NASHUA, N.H. LEWISTOWN, PA. OKLAHOMA CITY
DALLAS, TEX. PORTLAND, ORE.

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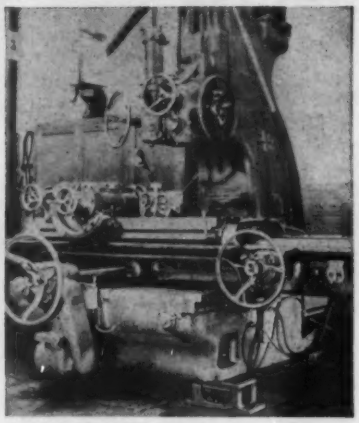
NATION-WIDE SALES • INSTALLATION • SERVICE

For more facts circle 625 on Reply Card

STOP VIBRATION
WITH
KORFUND VIBRATION CONTROL

This Thompson 12" x 60" Surface Grinder is installed at Firth Sterling, Inc., Pittsburgh, Pa. Vibration from grinders affected precision testing equipment on floor below; vibration and noise was also extremely annoying in executive, sales and laboratory offices. Korfund Isolators directly under the grinders, completely solved the problem. Korfund Units stop vibration and insure quieter machine operation.



This Pratt & Whitney #3B Jig Borer is installed at Caterpillar Tractor Co., Peoria, Illinois. Korfund Vibro-Isolators protect this precision machine against severe external vibration from trucks and trains which had made accurate work impossible. Isolators are set in pockets made by removing wood block flooring. Korfund Units stop vibration and reduce rejects—improve work quality.

This is one of the Heald #49 Bore-Matics installed at Thompson Products Co., Cleveland, Ohio. Shock transmitted from one automatic boring machine to another caused intermittent skips and gouges. One machine had to be kept idle until both were mounted on Korfund Isolators. Now they operate together and turn out perfect work. Korfund Units stop vibration and increase production.

Korfund Vibration Control also: permits more efficient plant layouts, decreases original building and foundation costs, permits installations without reinforcement of floors, reduces machine maintenance costs, and lengthens machine life.

Standard Korfund Isolators are available for most applications. A Selector Chart giving recommendations for both normal and critical conditions is available. See Sweet's Catalog Files or write us for Bulletin No. 5.

For specific recommendations, contact us or your local Korfund office. A half century of experience is at your disposal.

THE KORFUND CO., INC.

KORFUND VIBRATION CONTROL — SPRINGS — RUBBER — CORK

48-35R Thirty Second Place, Long Island City 1, N. Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

For more facts circle 626 on Reply Card

NEW PRODUCTS

(Begins on page 134)

coarse materials as cinder block. According to company, Hydrocide Colorcoat's oil base provides stability and elasticity, while the silicon compounds provide water repellency and permit the finished surface to "breathe." Natural surface-bond provided by the oil base is strengthened by the mechanical adhesion of reinforcing aggregate.

An important advantage claimed for Hydrocide Colorcoat is its unusually heavy body; this feature makes it possible to apply a completely protective finish in just one coat. And although much heavier than many paints, it can be applied with several types of brushes or spraying equipment. Company says it can be put on in stages without causing lap marks, can be applied uniformly to both masonry and wood, and withstands extreme temperature changes without cracking or peeling. It is not necessary to wet the wall before application, or use wet-curing after application. Shipped ready-mixed, it is available in white and nine colors. L. Sonneborn Sons, Inc.

84—VISE STAND doubles as portable work bench

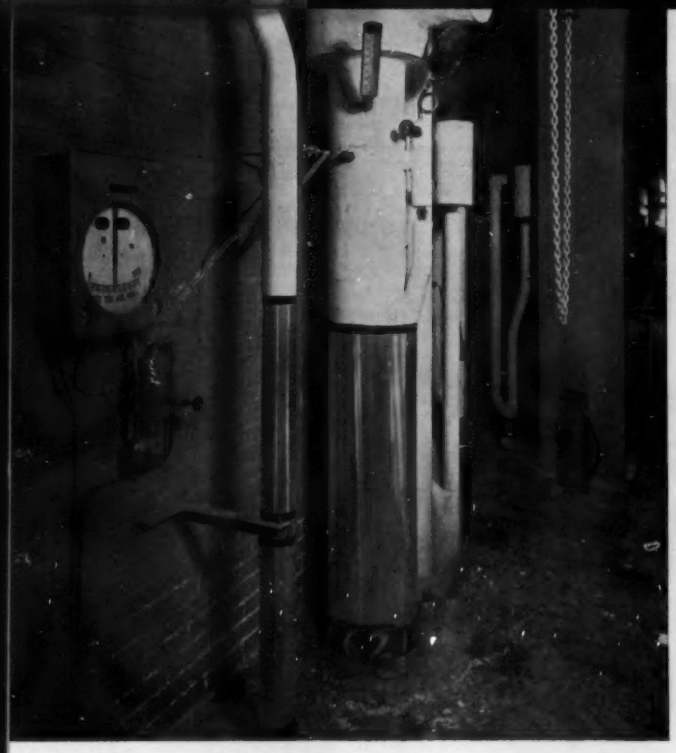
This portable vise stand sets up or takes down in a jiffy, says company—it is all in one unit. The built-in tray pushes up and folds for easy carrying and compact-

ness, requires less space on the truck or if stored between jobs. Though extra light in weight for portability, vise stand is sturdy and won't fold up in use. Other features include: large size vise base for easy mounting; 3 pipe benders; plenty of tool slots; pipe rest and ceiling brace. Toledo Pipe Threading Machine Co.

85—TRIMMER CAPACITOR is midget size, economical

Only ¼ in. in overall length, this low-cost, glass midget rotary trimmer capacitor is announced as the smallest glass trimmer on the market, with one of the lowest minimum capacitances available in units of this type. Company states that the capacitor has a very smooth trimmer adjustment and that because of its low cost and excellent electrical characteristics, it is suitable for application in any

For more facts circle 627 on Reply Card ——→



PROBLEM: High maintenance cost of canvas jacketing. High-pressure hot water hose used to clean floor damaged lower ends of lines and necessitated constant replacement.

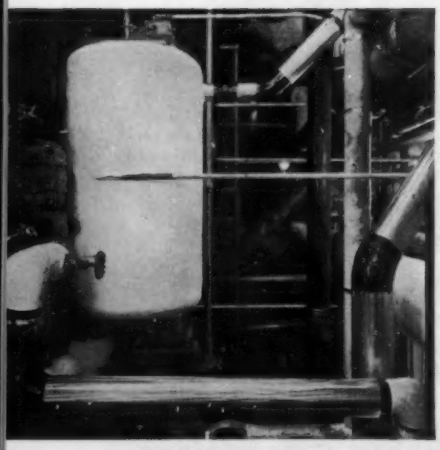
SOLUTION: Childers Aluminum Jacketing replaced canvas. Waterproof—easy to install—reusable.

PROBLEM: Extreme hazard of fire from static electricity generated in machinery. Canvas jacketing could burn easily causing danger to men and machinery in plant.

SOLUTION: Childers Aluminum Jacketing installed. Fireproof—easily cleaned of oil to reduce fire hazard.

Do Insulated Lines in Your Plant Cause These Three Common Problems and Hazards?

Read How Special Aluminum Jacketing Solved Them for Scott Paper Company



PROBLEM: Costly replacement of insulated lines damaged by oil drippage and bumping by men and tools.

SOLUTION: Maintenance engineers replaced canvas jacketing with Childers Aluminum Jacketing. Easy to wipe clean . . . durable and resistant to abrasion and abuse. Maintenance cost reduced.

The Scott Paper Company, Chester, Pa., and nearly 1,000 other modern plants in this country have protected insulated lines with Childers Aluminum Jacketing.

Childers Aluminum Jacketing cuts maintenance costs. It needs no upkeep . . . retains its protective value for years. Because Childers Aluminum Jacketing needs no painting, it can actually pay for itself in this saving alone. And of course, this modern aluminum jacketing can be removed and replaced easily for line repairs.

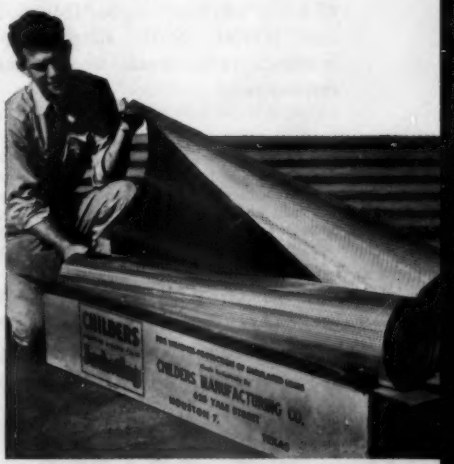
Easy installation cuts cost even farther. Only tools needed are pliers and wedge. Economical strapping holds jacketing securely—allows easy removal.

Try this low-cost protection in your plant. Write today for engineering data and information about how you can order a 400 sq. ft. roll to test on one of your insulated lines. No obligation. For full details write to: Childers Manufacturing Company, Department PLE-5,3620 West 11th Street, Houston 8, Texas.

SPECIFICATIONS

Childers Light-Weight Aluminum Jacketing

Shipped in rolls. 4 ft. wide; 100 ft. long with or without moisture barrier. Aluminum of .006″ thickness. Cut with straight edge and dull knife. Write now for full details and engineering data.



LOW COST Childers Aluminum Jacketing answers many problems in plants all over the country. It's light weight, easy to install—goes on with simple bands. Weather, water, heat and fire resistant—can be used and re-used for years.

(Advertisement)

Handling Coke and Limestone at Foundry.

Counter-weighted Skip Hoist at Large Industrial Plant.

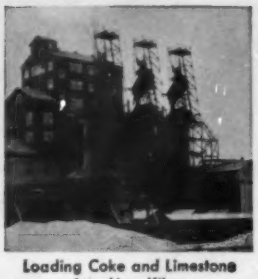
Installation at Large Refrigerator Plant.

if the lift is high

or the angle steep

you need a

BARTLETT-SNOW



Loading Coke and Limestone into Lime Kilns.

Skip Hoist

Installation View at Large Paper Mill.

● Unsurpassed for handling coal, coke, coke breeze, ashes, sinter, stone, limestone, ores or any other abrasive, dusty, hot, sticky or corrosive material. Our skip hoists have few moving parts. They incur little wear, require little maintenance. They will give you years of long, efficient, dependable and low cost service. Easily adapted to any loading, yard, track or discharging requirement.

Write for Engineering Bulletin No. 110 "Skip Hoists". It gives capacities of our standard 20, 30, 40, 60, 80 and 100 cubic foot buckets for various lifts;—Explains the operation of our "Plug Feed" and "Weigh Type" loading gates;—Describes the advantages of our bucket and head frame construction;—Illustrates scores of outstandingly successful installations. Get your copy. Fill in—and mail—the coupon *today.*

THE C. O. BARTLETT & SNOW CO.
6216 HARVARD AVENUE • CLEVELAND 5, OHIO

Please send me copy of your Engineering Bulletin No. 110 "Skip Hoists".

We want to handle about _____ tons of _____ per hour.

Name _____ Title _____

Company Name _____

Address _____

For more facts circle 628 on Reply Card

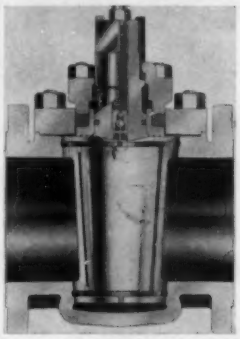
NEW PRODUCTS

(Begins on page 134)

commercial circuit requiring an economical trimmer. It is available in two sizes: 0.5- 3.0 uuf and 1.0- 4.5 uuf. Q is 500 at 50 megacycles. The temperature coefficient of the trimmer body is 200 ppm. Constructed of glass, with a coating of metal bonded to it, the trimmer capacitor has a self-lubricating nylon bushing threaded to take a 6-32, Class 2 type screw. The bushing is designed with strong positioning lugs which resist stress or strain and help assure positive seating. Corning Glass Works.

86—PLUG VALVE with multiple sealing feature

Longer life, ease of operation, ease of adjustment and positive pressure-sealing are claimed for this new lubricated plug valve design. A feature is multiple sealing which includes lubricant, O-ring, gland liner and packing seals. Four vertical lubrication grooves in the plug serve



to assure uniform and adequate distribution of a sealing lubricant around the port areas. Two grooves (180 deg apart) do not cross body ports in operation but are connected with lubricant supply only when the plug is in fully opened or closed position.

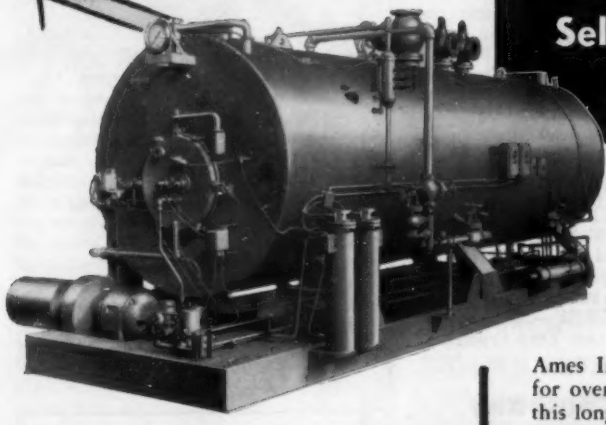
In this valve, the O-ring provides a positive seal between gland liner and plug shank, it is explained, while the resilient packing seals between gland liner and cover. The bottom of the gland liner mating with the lapped surface on the top of the plug provides an additional seal. This gland liner is company's Alloy 40 bronze, with low friction bearing characteristics and a melting point of 1750 F. The new plug valves are available in steel, 150 and 300 lb pressure classes; and in semi-steel, 150 through 800 lb WOG in sizes ½ to 12 in. Form 1003 contains details. The Ohio Injector Co.

87—METAL HOSE for conveying abrasives

Especially designed for use in conveying materials having abrasive and corrosive characteristics—grains, bulk chemicals, ashes, cement—this flexible metal hose is available in two types. A standard weight, Type U-100-L, incorporates 0.015

SO YOU HAVE TO BUY A BOILER!

Select an AMESTEAM GENERATOR and solve all your problems



You don't have to dig through mountains of data to pick the boiler that will give your company the most economical and satisfactory service! It's more a question of *where* you buy it than what boiler you choose. What's the maker's reputation?

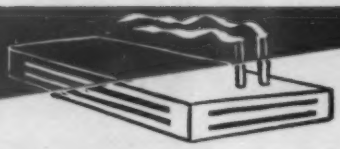
Ames Iron Works have been building boilers of quality for over 100 years. Back of every Amesteam Generator is this long, successful experience — represented by the Ames Engineering Staff, a large group of skilled boiler makers and an efficient, nation-wide sales and service organization at your disposal. Yes, quality and experience *do* count — and the thousands of Amesteam Generators giving dependable, low-cost service in power, process and heating applications are proof of it. Why not be *sure* by specifying Amesteam Generator? Write today for details and name of your Ames representative.

AMESTEAM GENERATOR

- 80% guaranteed thermal efficiency.
- Single economical package purchase.
- Package installation economy.
- Completely safeguarded.
- Easy, inexpensive maintenance.
- 20 sizes, 10 to 600 H.P., 15 to 200# W.P., oil, gas or oil-gas combinations with quick fuel switchover feature.

AMES IRON WORKS, INC.
BOX M-45, OSWEGO, N. Y.

For more facts circle 629 on Reply Card



EVERY INDUSTRY SAYS,
"THIS ONE STEAM TRAP
STANDS OUT!"

CHEMICAL
"Many of our Super-Silvertop Steam Traps have not been touched for 8 years." Los Angeles, Calif.

REFINERY
"Our Super-Silvertops were installed in 1937 and are still rendering satisfactory service after 18 years." Toledo, Ohio.

PLASTIC
"Anderson Super-Silvertop traps in our No. 2 plant are doing a good job . . . with no shutdowns." Chicago, Illinois.

CONTRACTOR
"We consider your traps the best in the industry. We also appreciate very much that Anderson exerts extra effort to assist contractors like ourselves." Spartanburg, S. C.

Only an inverted bucket steam trap with a guided bucket can receive compliments like these. This exclusive Super-Silvertop feature prevents bucket damage, assures years of trouble-free service. Valve and seat are of a special chrome nickel alloy, developed for the corrosion and abrasion conditions in steam lines. Three pipe connections in the head permit Super-Silvertops to be installed straight-in-line or as an elbow with a minimum of piping. It will pay you, as it has hundreds of others, to standardize on Super-Silvertops. FREE—36-page book, "Solving Steam Trap Problems."

The V. D. Anderson Company
Subsidiary of Chesapeake Industries, Inc.
1939 West 96th Street • Cleveland 2, Ohio

SUPER·SILVERTOP
the Engineered Steam Trap by
ANDERSON

For more facts circle 630 on Reply Card

NEW PRODUCTS

(Begins on page 134)

in. galvanized steel strip, and the heavy-duty hose, Type U-120-L, 0.020 in. galvanized strip. Both are furnished with a 0.012 in. stainless steel strip liner unless a carbon steel liner is specified. Angle iron and standard flanges, pipe nipples or special flanges, brazed on, may be had. Six standard sizes from 3 to 8 in. ID are available in both types. Universal Metal Hose Co.

88—OUTDOOR INCINERATOR burns refuse safely

This low-cost, industrial outdoor incinerator has a 12 bushel capacity and is complete with heavy duty grate and ash pan base. Manufacturer says that improved draft control permits burning of

damp, green or dry refuse and eliminates the fire hazards of burning, blowing scraps and minimizes smoke and smell. Made under a new process of bonding molten aluminum to steel, the burners are designed to give long rust-resistant performance under all climatic conditions. The unit stands about 5 ft. high. It is shipped assembled, and weighs 165 lb. The unit is used by lifting off hood, pouring in up to 12 bushels of refuse at a loading, igniting from top and replacing the hood. It burns with an intense heat, reducing refuse to fine ash, and it is noted requires no additional fuel. It sells for about $69.00. Alsto Co.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 213-214.

89—BUSWAY SYSTEM, improved, low-voltage type

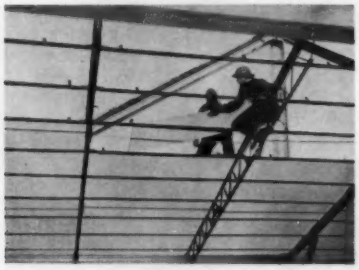
Uni-Bus is announced as a new development in low voltage feeder and plug-in busway systems. Available in ratings from 225 to 775 amp, 600 v, two-, three-, and four-pole types, the Uni-Bus System features a single size ventilated steel

(Begins on page 134)

enclosure accommodating all current carrying capacities. Construction details are identical for both feeder and plug-in types; a duo-circuit arrangement offers low reactance characteristics for both. Weight savings up to 40 per cent are claimed, and either horizontal or vertical installations are possible. According to company, the Uni-Bus plug may be isolated from bus by safety slide and the utilization circuit is energized through primary and secondary contacts in the plug. Roller-Smith Corp.

90—INSULATION for roofs and walls of buildings

This material is designed to provide thermal and acoustical insulation for roofs and walls as well as an attractive interior finish. It is offered for use with protected metal, cement asbestos board, aluminum or painted galvanized sheets for construction of warehouses, foundries and similar permanent buildings. Faced on



one side with Fiberglas mat, the product is claimed strong enough to span spaces between tee bars and purlins without deflection. It comes in 24-in. widths; lengths to 96 in., and thicknesses of 1 to 2½ in. depending on thermal requirements. "K" value of the material is said to be a low 0.25 Btu/hr/ sq ft/ in./ deg of temperature difference at 75 F mean temperature.

This insulation board has a tan, rippled-textured appearance softened by the mat adhered to the exposed face. Surface fibers are matted and the addition of the facing provides an easily painted interior side. The boards are light in weight and economically and easily installed, it is pointed out; application is from outside the building. Since this material does not include a vapor barrier on the warm side of the insulation, it is recommended for dry-occupancy buildings only. Owens-Corning Fiberglas Corp.

91—HOT SPRAY VINYL for economical corrosion control

Formulated to combine ease of handling and good spraying characteristics with optimum build and appearance, this new hot spray vinyl is claimed to provide 4 mils in a single spray pass. One prime and one hot spray coat give the 5- to

PLANT ENGINEERS!

Solve dozens of Dirt, Moisture & Entrainment Problems with . . .

Hi-eF® PURIFIERS

As a plant engineer and production man you know that steam, vapors, compressed air and gases pick up entrained moisture and solids as they pass through pipelines. This entrainment in the form of line scale, rust and condensate shortens the life of your equipment . . . increases maintenance costs . . . and adds hours of downtime to your operation.

Today, we have a new, easy, economical way to remove all that dirt and moisture from all kinds of steam and air processes. Install low cost Anderson Hi-eF Purifiers employing a new design of multi-stage separation . . . guaranteed to remove better than 99% of all entrainment! They do the job automatically without the use of filters or any moving parts. This means that once installed, these purifiers never need cleaning or maintenance of any kind.

Save money for your plant. Use Hi-eF Purifiers to protect your air tools, steam ejectors, rotating steam drums, kettles, compressors and scores of other applications. Try one on your most troublesome entrainment problem. Anderson guarantees satisfactory results.

The V. D. ANDERSON Company
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Subsidiary of Chesapeake Industries, Inc.

Free!
Write for Bulletins 501 and 201 describing many money-saving applications with Hi-eF Line Type Purifiers.

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Watchdogs of Steam • Air • Gas Vapor Pipelines and Equip...

ANDERSON Hi-eF PURIFIERS

For more facts circle 631 on Reply Card

EXTEND GEAR LIFE

with UCON synthetic lubricants

Trade-Mark

Here's an actual case:

Identical bronze ring gears, driven by alloy-steel worms, in speed reducers that couple 75-hp. motors to rotary pumps . . .

. . . after 6 months on UCON Lubricant LB-1200-X.

. . . after 1 year on UCON Lubricant LB-1200-X.

. . . after 6 months on petroleum oil.

WHY these outstanding results?

Because UCON Lubricants have

HIGH

- *film strength*
- *resistance to sludging and carbonization*
- *viscosity indexes*
- *wear resistance*

Find out how UCON Lubricants can help you solve your tough lubrication problems. Return the coupon *today*.

UCON LUBRICANTS are products of:

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Carbide and Carbon Chemicals Company
A Division of Union Carbide and Carbon Corporation
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Please send me the booklet "UCON Fluids and Lubricants," Form 8326.

Name_____

Company_____ Position_____

Address_____

"Ucon" is a registered trade-mark of Union Carbide and Carbon Corporation.

For more facts circle 632 on Reply Card

NEW PRODUCTS

(Begins on page 134)

6-mil total thickness needed in most corrosion protection work, says manufacturer, and vinyl thicknesses in the 10- to 15-mil range without runs or sags are possible in an uninterrupted multiple pass spray application. The spray is used with company's P-50 Metal Primer. Prufcoat Laboratories, Inc.

92—EXPLOSION-PROOF Motor in NEMA sizes, 1 to 5 hp

Announced as meeting the strict specifications of the National Board of Fire Underwriters, the Type E Motor is designed to operate in dangerous locales and is made for Class I, Group D services for highly inflammable gases and volatile liquids, and Class II, Groups F and G for combustible dusts. It is fully enclosed, with special provision to guard against fire, dust and moisture. The Type E has a spark-proof aluminum fan; a Type EN is without fan.

The conduit box is sealed and of heavy design with split dome. Internal bearing caps are extended along the shaft to insure against any spark traveling to the exterior. In these motors the rabbeted register fits are longer than usual to provide the most complete seal of bracket to motor frame. The frame is one-piece cast iron with external ribs for reinforcement and to provide rapid heat dissipation. A drain plug can be furnished at the end of the bracket. The Types E and EN Motors embody asbestos-protected windings. Lubriflush lubrication and normalized castings. Bulletin 1879 describes these motors. U. S. Electrical Motors, Inc.

93—STANDING MAT is resilient, long wearing

Neo-Sponge Comfort Mat is made through a process of blowing millions of inert nitrogen bubbles into Neoprene, says manufacturer, and its properties are

permanent resiliance, high electrical resistance, (61,000 v before puncture) and almost impervious resistance to acid, oil, grease and heat. Suggested for use wherever employees stand at their jobs, this mat is claimed to outwear similar products made of rubber and not to absorb liquid or vapor. It is available in thicknesses of ¼ and ⅜ in. and in standard sizes up to 36 in. wide by 10 ft. long. The American Floor Products Co.

Modernize your shop — save money — with new

Type 1300 KIMWIPES!

You'll be money ahead when you switch to Type 1300 Kimwipes. They're the modern new disposable wipers that actually replace old-fashioned cloth and waste wiping material and cost four to ten times less!

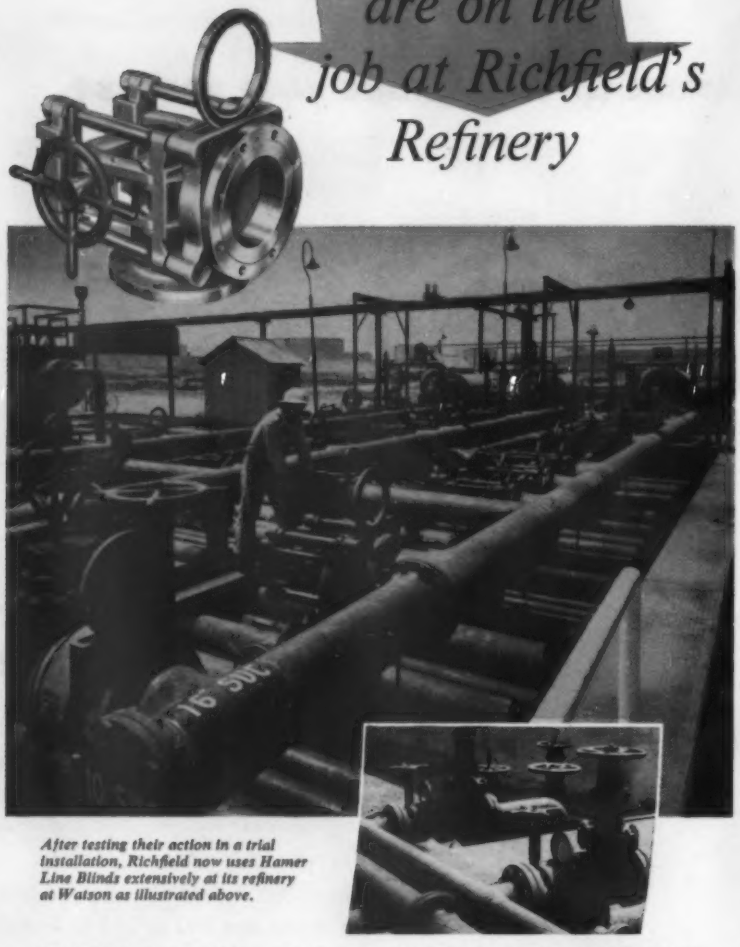
New Kimwipes 1300 are soft. Strong. Absorbent. A full 12″ x 18″ in size, they hold up to 8 times their own weight in liquids. They're non-abrasive, too. There's no holdover of metal chips or other infectious material that may cause dermatitis and loss of man hours. Type 1300 Kimwipes are absolutely clean to start with, and are disposed of after use. Ask your salesman for samples. And remember, there are two other kinds of Kimwipes you can choose from: Type 900-S (optical wipers) and Type 900-L (regular wipers). Save money. Order today!

Kimberly Clark
INDUSTRIAL WIPERS
Kimwipes

Kimberly-Clark Corporation • Neenah, Wisconsin

For more facts circle 633 on Reply Card

Impenetrable Sealing
HAMER BLINDS
are on the job at Richfield's Refinery



After testing their action in a trial installation, Richfield now uses Hamer Line Blinds extensively at its refinery at Watson as illustrated above.

HAMER *Visible Shut-off* LINE BLIND VALVES

HAMER *Plug Valves*

Thousands of users have proven the easy and immediate operation of Hamer Plug Valves. Will not stick or freeze.

Refinery operations require a valve that will provide a continual leakproof line shutoff. Hamer Blinds with their foolproof sealing action are unsurpassed for providing an absolute line seal that's both positive and permanent. In addition, Hamer Blinds fast, one minute, one man operation literally pay for their cost in downtime saving.

HAMER

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NEW BOOKS

for the plant engineer

Corporate Taxation

AMA CORPORATE TAX Summary of the 1954 Internal Revenue Code. Size 11 by 8½ in.; 45 pp; paper bound. Published by American Management Association, 330 West 42nd Street, New York 36, N. Y. Price $2.75 — AMA members $2.00.

TWELVE MAJOR areas of corporate taxation embodied in the Internal Revenue Code of 1954 have been selected for comparison in this Summary. It shows how major considerations of the new law differ from the old, and what such changes mean.

Industrial Relations

INSIDE INDUSTRY by Ray Smith. 9¼ by 6¼ in.; 139 pp; cloth bound; published by Creative Enterprises, Publishing Division, 6620 Diversey Ave., Chicago 35, Ill. Price $3.50.

BOTH THE EXECUTIVE and the worker should find this book extremely helpful in improving labor-management relations. The fact that, along with the mechanics of industry, the human element must be taken into consideration at all times is the main theme; one which must not be underrated.

After 29 years of studying industry, the author finds that the right emotional atmosphere in industry can make or break our economic strength. He delves into every-day matters such as errors in management, habits of workers, mental strain, a new boss from outside, loafing on the job, incentive system, the foreman's unpopularity and how to cure present-day inequities.

Plant Layout

PRACTICAL PLANT LAYOUT by Richard Muther. Size 11¼ by 8¼ in.; 363 pp including index; illustrated; cloth bound. Published by McGraw-Hill Book Co., Inc., 330 West 42nd St., New York, N. Y. Price $12.00.

THE AUTHOR of this book has extensive experience in plant layout covering research, teaching and consulting. He is presently Management Engineer for Vendo Company of Kansas City.

In this book is presented a great deal of information designed for better layout and should give readers a greater appreciation of the importance and bearing of plant layout on plant operations. Consideration is given to the various factors that have an influence on layout.

One main portion of the book covers the planning of layout. In it, attention

Announcing:

A New Du Pont Chemical Rubber for Industry—

HYPALON®

(CHLOROSULFONATED POLYETHYLENE)

USES FOR "HYPALON" INCLUDE:

HOSE — for handling strong acids, hot fluids

TANK LININGS — for storage of corrosive materials

GASKETS AND PACKINGS — for corrosive, high-temperature service

PROTECTIVE COATINGS — over rubber, metal, wood, masonry

COATED FABRICS — for diaphragms, tarpaulins

MOLDED AND EXTRUDED PARTS — O-rings, tubing, miscellaneous parts

"Hypalon," the newest addition to the Du Pont family of versatile chemical rubbers, offers new performance and operating characteristics for such industrial rubber goods as hose, tank linings, protective coatings, gaskets and packings, coated fabrics, molded and extruded parts. The unusual stability of "Hypalon," under a wide range of conditions, means long service life for these products, low maintenance and replacement costs, better operating performance.

PROPERLY COMPOUNDED, PRODUCTS OF "HYPALON":

- are completely ozone-resistant
- can operate continuously to 250°F., intermittently to 350°F.
- resist oils, greases, oxidizing acids and chemicals
- resist outdoor deterioration, abrasion, flex cracking
- are light-stable in a wide range of colors
- do not support combustion

It will pay you to investigate Du Pont "Hypalon." Contact your rubber-goods supplier—almost all rubber manufacturers can produce products of "Hypalon." For further details, mail this coupon today.

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(Chlorosulfonated Polyethylene)

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Elastomers Division, PL-4
Wilmington 98, Delaware

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EQUIPMENT THAT STRETCHES INTO THE FUTURE

Most any size or shape of plating tank, pickling tank, storage tank or other processing equipment can be lined or covered with quality ACE hard or soft rubber for protection against corrosion, to resist abrasive wear, or to provide electrical insulation. Ask for Bulletin CE-53.

STOP VALVE CORROSION *at lower cost*

There's an ACE hard rubber, rubber-lined, or plastic-lined valve for every corrosion application. Sizes from 2" to 24". Diaphragm, gate and check types. Free *Bulletin CE-52* lists chemicals that can be handled.

ACE chemical equipment

"more resistant to more corrosives"

Complete line of rubber and plastic processing equipment . . . eight basic materials for pipe and fittings, valves, pumps, tanks, molded parts, utensils, etc.

FOR HIGH PRESSURES OR BIG PIPE LINES

ACE Rubber-Lined Steel . . . strength and pressures of steel plus chemical resistance of hard rubber. Excellent for alkalis, most inorganic acids, many organic acids, all salts, bleaches. Sizes 1¼" to 24" and up. *Bulletin CE-52.*

ACE SARAN PIPE

An old stand-by with many new uses . . . Odorless, tasteless, general-purpose rigid pipe and semi-flexible tubing. Highly resistant to most chemicals. Threaded pipe ½" to 4", tubing ⅛" to ¾". *Ask for Bulletin 351.*

ACE rubber and plastic products

AMERICAN HARD RUBBER COMPANY

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For more facts circle 636 on Reply Card

is given to the ten guiding fundamentals. Other details that are treated in this section are as follows: fact collection, flow determination, flow diagramming, measurement of time involved, visualization, and installation.

Force Action and Reaction

ENGINEERING MECHANICS by G. N. Cox and W. G. Plumtree. Size 9¼ by 6¾ in.; 382 pp including index; illustrated; cloth bound; 1954 edition. Published by D. Van Nostrand Company, Inc., 250 Fourth Ave., New York 3, N. Y. Price $5.50.

THIS BOOK, designed primarily for undergraduate study, requires a knowledge of physics and calculus for a more thorough understanding. In this second edition, information has been added and increased. The text is liberally sprinkled with illustrations and contains numerous problems and their solutions.

Among the 13 main sections are the following: analysis of simple structures and flexible cables; friction; moments of inertia; work, energy, and power; impulse and momentum; equilibrium of coplanar force systems.

Glass Fibers and Plastics

GLASS REINFORCED PLASTICS. Size 9¾ by 6¼ in.; 248 pp including index; illustrated; cloth bound; 1954 edition. Published by Philosophical Library, Inc., 15 East 40th St., New York 16, N. Y. Price $10.00.

INFORMATION in this book is a compilation of the contributions by a number of people. It touches upon the chemistry of unsaturated polyester and allyl resins, and covers ancillary materials including catalysts, accelerators, fillers, release agents and pigments.

Commercial molding processes are discussed in one section. Text material on rod and tube production and methods of mass production follows. In the portion on design and properties of structures, comparison is made between glass laminates and steel.

The book covers applications of glass fiber plastics in the aircraft, automobile and boat industries. It also gives attention to the use of glass fiber laminates in the electrical field.

Engineer in Industry

A PROFESSIONAL LOOK at the Engineer in Industry. Size 9 by 6 in.; 124 pp including index; paper bound. Published by National Society of Professional Engineers, 1121 15th Street, N.W., Washington 5, D. C. Price $3.00; to NSPE members, $1.50.

IN THIS PUBLICATION are reviewed the major causes of dissatisfaction among engineers in industry and the background and current status of drives to meet the engineers' problems

TAKE IT UP WITH R&M HOISTS·CRANES·WINCHES

BIG R&M CRANE MOVES STEEL FOR KILROY

R & M built this big 15-ton crane to lift and move structural steel—never a dainty, packaged commodity—with two-handed flexibility. Two 7½-ton R & M Type "F" Hoists, independently controlled from the cab of this double-girder, five-motor crane, eliminate dangerous load-balancing.

Maximum bridge deflection (loaded), ½". End truck length, 15' 2", wheelbase, 11'. Bridge speed, 250 fpm maximum. Bridge control, six-step variable speed. Bridge brake, foot-controlled hydraulic. Hoist lift, 20'. Lift speed, 20 fpm. Trolley control, four-step variable speed to 125 fpm. Total crane weight, 60,000 pounds. User, Kilroy Structural Steel Company, Cleveland, Ohio.

Pictured at right—45-foot span, 20-ton capacity R & M crane with 5-ton auxiliary hoist. Standardized cranes in single or double I-beam types available quickly in 20 to 65-foot spans; capacities to 10 tons.

BRING YOUR R & M HOIST DATA FILES UP TO DATE. SEND FOR FREE BULLETIN

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VENTILATORS MOYNO PUMPS HOISTS CRANES MOTORS FANS

ROBBINS & MYERS INC.

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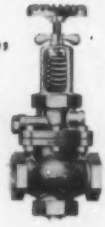
When the Pressure is On—

use ATLAS REDUCING VALVES

Maintaining constant reduced pressure depends on positive seating action—that's why Atlas reducing valves are made with the best seat materials . . . Stellite, corrosion and wear resistant alloys or composition . . . whatever is best for your requirements. Whether your service is steam, water, oil, gas or air, you can count on the Atlas line for design, workmanship, materials and performance of the highest quality.

Here are 4 types of tight-seating reducing valves from the complete Atlas line:

STEAM REDUCING VALVE . . . TYPE "B"
Spring loaded, piston operated, internal pilot actuated. Completely self-contained. Initial pressures to 1500 psi, reduced pressures as low as ½ psi. Stellited valves and seats. Two integral strainers.



WATER REDUCING VALVE . . . TYPE "E"
Spring loaded, diaphragm operated, single seated with balanced piston. For air, gas, oil or water. Initial pressures to 300 psi, reduced pressures from 5 to 125 psi. No hammer or chatter. "O" ring seal on piston.

STEAM REDUCING VALVE . . . TYPE "D"
Spring loaded, diaphragm operated, externally controlled. Initial pressures to 600 psi, reduced pressures as low as 3 psi. Single seat. Simple in design and ruggedly constructed for ease of operation and easy maintenance.

REDUCING AND RELIEF VALVE . . TYPE "F"
Spring loaded, diaphragm operated combination valve for air, gas, oil or water. Initial pressures to 4000 psi, reduced pressures from 2500 psi down to 0 psi. Reduces to set point without shock, holds accurately. Designed for low capacity applications. Compact, completely self-contained.

The Atlas line of regulating devices meets most every application. For special requirements, Atlas will "custom-engineer" for you. Write for Bulletins 36G and 37R.

ATLAS VALVE COMPANY
284 SOUTH STREET, NEWARK, N. J.
Representatives in Principal U. S. Cities and in Canada

For more facts circle 638 on Reply Card

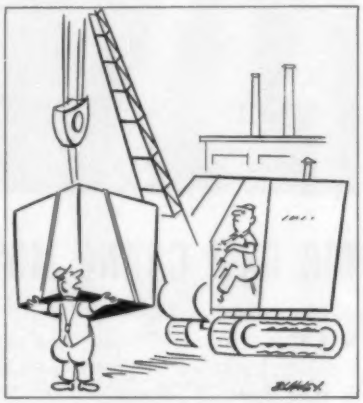
by the development of engineers' unions.

Comprehensive review of economic data includes six illustrative charts of the trends in engineering salaries and eleven tables of salary information from various sources.

Timber Construction

TIMBER CONSTRUCTION STANDARDS. Size 11 by 8½ in.; 42 pp; paper bound; 1954 edition. Published by American Institute of Timber Construction, 1757 K Street, N.W., Washington 6, D.C. Price $2.00.

PUBLICATION covers design, fabrication, and erection of engineered timber construction, and standard practices of the industry. These standards provide engineers and others with basic information and criteria for use as a guide in all operations leading to sound timber construction. A classified listing of recommended applicable specifications and codes and a list of notations and abbreviations are included.



"Brace yourself—I'm going to let go now."

Plumbing Standards

NATIONAL PLUMBING CODE. Size 7¾ by 5¼ in.; 174 pp; paper bound. Published by the American Society of Mechanical Engineers, 29 West 39th Street, New York 18, N. Y. Price $3.50.

DEVELOPMENT of this code, which is designed to modernize existing practice and to coordinate plumbing work, took more than 20 years. This nonmandatory code is supported by a national consensus and is helpful for setting uniform local standards.

Among the topics considered in the 14 chapters are some of the following: joints and connections; traps and cleanouts; plumbing fixtures; indirect waste piping and special wastes; vents and venting; storm drains; inspection, tests, and maintenance. The introductory section contains an extensive list of plumbing definitions.

Like Easy Fishing?

GET NE Sherarduct RIGID STEEL CONDUIT

Easy fishing . . . that's one reason contractors like Sherarduct rigid steel conduit. In addition to a smooth inside surface, Sherarduct's accurately cut threads let conduit ends butt inside the coupling . . . eliminate gaps that interfere with easy fishing.

Sherarduct has other plus features as well: The Sherardizing process of galvanizing that alloys zinc with the conduit wall, (plus a baked-on Sher-enamel coating) fortifies Sherarduct against rust and corrosion for life. All surfaces, including the hill and valley of every thread, are securely protected against corrosion.

Finally, the gradual heating and cooling of the Sherardizing process normalizes the metal in an annealing like process. Result: easier working, forming and bending on the job.

Write for a free copy of our new Sherarduct facts book. You'll see why the Sherardizing principle makes Sherarduct "galvanized conduit at its best."

Listed by Underwriters' Laboratories, Inc.

LIFE-TIME CORROSION PROTECTION
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EASY FISHING
•
ZINC PROTECTED THREADS
•
STRONG COUPLINGS
•
THOROUGH GROUNDING
•
EASY BENDING

Sherardizing is galvanizing at its best . . . Sherarduct is galvanized conduit at its best

NATIONAL ELECTRIC PRODUCTS CORP. PITTSBURGH, PA. 50TH ANNIVERSARY 1905 1955

National Electric Products

PITTSBURGH, PA.

3 Plants • 10 Warehouses • 36 Sales Offices

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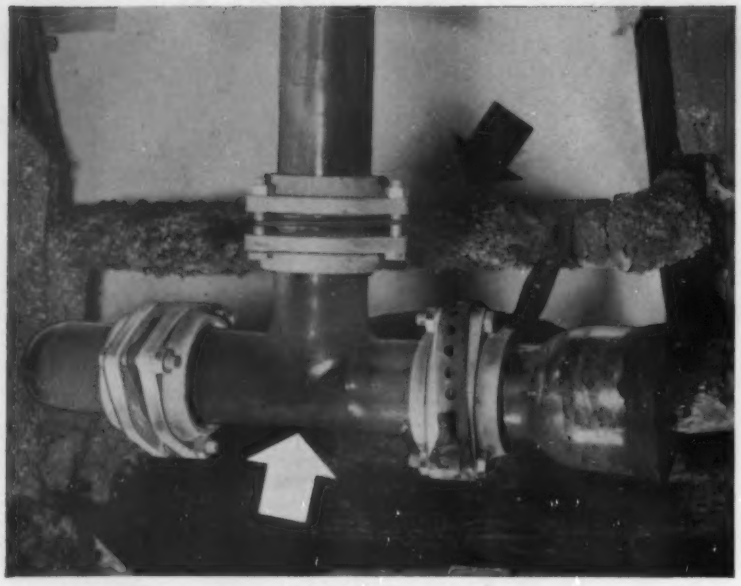


What happened to the metal drainline (black arrow) will never happen to the PYREX drainline (white arrow).

Stop the constant repair and replacement of your acid drainlines—**for good**

Many plant engineers are finding PYREX brand "Double-Tough" glass pipe a permanent answer to their acid drainline problems. Only hydrofluoric acid and phosphoric with traces of fluorides have any measurable effect on glass pipe.

But what about breakage? After all, it *is* glass. Tempered PYREX brand glass No. 7740 is called "Double-Tough" for good reason. It's made especially for industry. The chemical industry in particular is using miles and miles of it and much of it has been in service for many years without repair or replacement. PYREX pipe today is *not* fragile.

Besides its great resistance to corrosion, PYREX pipe is transparent. At any time you can see what's what inside your lines. Its hard, smooth inside surface resists clogging and makes cleaning easy. Your maintenance men or pipe fitters can install PYREX pipe as easily as ordinary pipe.

We make a wide range of pipe sizes and fittings. Write today for PYREX Pipe Bulletin EA-1. This will give you a more detailed picture of what PYREX pipe is and how it can eliminate your problem of handling acids and other corrosive materials.

Hammering home a nail with a piece of PYREX brand "Double-Tough" glass pipe demonstrates its strength.

CORNING GLASS WORKS
31-4 CRYSTAL STREET
CORNING, N. Y.

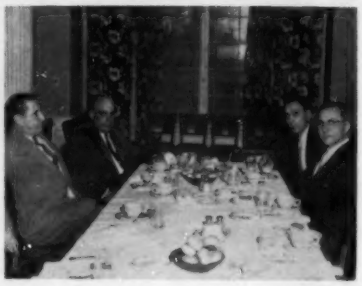
Corning means research in Glass

For more facts circle 640 on Reply Card

Activities of AIPE

(Continued from page 112)

ucts, Inc., chairman; A. L. Borgia, Weatherhead Co., vice chairman; Arvin R. Sautters, A. R. Sautters & Co., vice chairman; William J. Daugherty, American District Steam Co., recorder; and Harry Gellin, Gellin Co., board representative.



Informal get-together of Cleveland plant engineers in March was attended by, left to right: C. F. Petzinger; W. W. Ferris; A. L. Borgia; and Mr. Scott

Several members met on March 9 to discuss the formation of a chapter of the AIPE in Cleveland. Plant engineers in the Cleveland area interested in the club should contact Tony Borgia, plant engineer of the Weatherhead Co. on 300 East 131 St., Cleveland.

Twin City

Mr. D. E. Cottrell, Supervisor of Indirect Labor Standards, and Mr. P. E. Laughlin, Supervisor of Application, both from the Minneapolis-Honeywell Regulator Co., discussed the work measurement program used in their company at a recent meeting of the Twin City Plant Engineers' Society. They covered such subjects as: 1. Work measurement for maintenance trades; 2. Objective of measurement; 3. Accomplishment of measurement; 4. How to measure a trade and develop standards; and 5. How to apply standards and demonstrations.

An informal discussion period followed the presentation and questions from the floor were answered.

Mohawk-Hudson

At the second meeting of the newly formed Mohawk-Hudson Plant Engineers' Society, the following officers were elected. Jim Armstead, of F. C. Huyck & Sons, president; Malcolm MacKenzie, Behr-Manning Corp., vice president; Charlie Felter, W. and L. E. Gurley Co., secretary; and Lawrence Boberschmidt, Albany Hospital, treasurer.

A tour of the Kenwood Mills was scheduled for their next meeting, with four such plant tours to be arranged during the calendar year.

A hydraulic system works better... lasts longer ...costs you less

with FILTERED FLUID

A little dirt goes a long way in a hydraulic system. At the least, it seriously lowers the system's efficiency. At the worst, impurities can put the system completely out of action with a bad case of sticky valves, leaky seals and jammed pistons. Even a closed system can contaminate its own fluid with microscopic bits of metal worn from moving parts.

So, as you can see, proper filtration of hydraulic fluid is vital.

In fact it's indispensable to: —

A Machine tool production schedules and standards of work quality.

B Efficient, profitable operation of machines like fork-lift trucks and earth-moving equipment.

C Precise, effective control of automatic manufacturing processes.

D Safe, reliable operation of critical aircraft control mechanisms.

E Longest possible service life of *all* hydraulically-operated equipment.

You'll find an economical answer to your specific hydraulic fluid filtration problem among the wide selection of standard Purolator units.

Write for Purolator's General Industrial Catalog, or send us details of your particular application. We'll be glad to advise you . . . there's no obligation on your part, naturally. Address Dept. P2-44, Purolator Products, Inc., Rahway, N. J.

PUROLATOR

"FIRST IN THE FIELD OF FILTERING"

PUROLATOR PRODUCTS, INC., Rahway, New Jersey

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NOW AVAILABLE

FROM NATION-WIDE WAREHOUSE STOCKS*

BIG CABLES

WITH THE SUPERB

TOUGHNESS

AND

FLEXIBILITY

FOUND ONLY IN

BRONCO

Certified **60**

Bronco 60 Certified Type W cables are made in all sizes from 8/2 to 1/4. They have a tough Neoprene jacket certified by a registered professional engineer to contain not less than 65.46% Neoprene. Made with coarse or fine stranding, Certified Type W possesses incomparable flexibility. The proof is in the product. Try Bronco 60 Certified Type W–you'll standardize with Certified.

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For more facts circle 642 on Reply Card

Package Boilers

(Continued from page 109)

total; and a daily record of the operating temperature and CO_2 reading from the stack of each boiler. With all this information recorded daily, boiler trouble could be spotted immediately if it occurred.

But Auburn opens only the boilers once a year. And, according to the engineering department, "we wouldn't have to do that if it weren't for boiler inspection."

Maintenance men check stack temperature and CO_2 daily. A monthly check is made on water hardness and pH. Boiler water is chemically treated and a soot remover is used.

Maintenance costs less than $100 a year. Maintenance materials cost about $30 to $40 annually. Labor runs about $50.00 a year since a maintenance man must open and close the plant. Other than the routine daily check of stack temperature and CO_2 the boilers are left alone.

These two steam generators have run economically and without trouble for seven years. They have consistently delivered better than 80 per cent efficiency. Auburn's engineers do not feel they can ask more than that from any boiler, package or not.

Couplings and Hose Cut Cost

(Continued from page 119)

line. Moreover, the absence of fixed outdoor piping and valves for air and steam supply would automatically eliminate the cold weather operation difficulties due to condensed steam freezing within the fixed supply line or its valves.

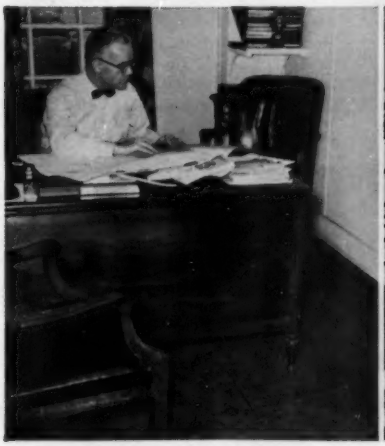
However, this solution would require a quick-connect hose coupling that could provide a leak-proof connection as soon as it was closed, and remain leak-proof at high pressure. The coupling should operate in such a way that it could be connected or disconnected easily and rapidly, preferably with the use of only one hand.

Another severe practical requirement was that the coupling should provide a full swiveling action for the hose, so as to avoid hose twisting or kinking, a major cause of eventual hose breakage. Furthermore, since the steam and solvents carried by the lines attack the material of the pressure seal, it was imperative that it be possible to change seals conveniently and rapidly replace them when necessary without disassembling the coupling. A quick-connect coupling, made by Titeflex, Inc. provided all these essential characteristics.

A typical example of the flexible hose and quick-seal coupling arrange-

Smooth for precision work.

Never splinters—hard to dent.



Durable flooring.

Takes plenty of punishment.

J. D. Kingery, General Manager
Shurhit Products, Inc., Waukegan, Ill.

"Some panels in use over 20 years!"

Shurhit finds many uses for MASONITE PRESDWOOD

"I assure you it would be difficult for us to get along without Masonite Presdwood. It's an extremely versatile material for which there seems to be no end of practical applications," says Mr. Kingery.

To give you an idea of Presdwood's versatility, these are some of the ways Shurhit uses these smooth, grainless hardboard panels:

• worktable tops • drawer dividers, bottoms • dust covers for tote pans containing finished parts • shelving and backing for storage bins • flooring in shop and office • worktables around machines

The best of this bargain is that you can get Presdwood®—in the type and thickness you want—from your lumber dealer. Write for free booklet showing how and where to use these cost-cutting panels.

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Dept. PE-4, Box 777, Chicago 90, Ill.

Please send me your booklet on "Factory Methods with Masonite Presdwood."

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Look for This Man—He Makes The Difference

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PANEL PRODUCT OF MASONITE® CORPORATION

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CONTROL

FEATURING:

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- Self-Adjusting Heavy Duty Brake
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- Overload Protection
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CAPACITIES: from ⅛ to 1 ton. Single and 3 phase. ¼ ton model weighs only 51 pounds.

$149.50 and up

Built to serve you without costly maintenance

Lodestar is the first truly "heavy duty" version of the small electric hoist. The CM Lodestar is designed to operate without costly maintenance or interruptions in your work schedules. The initial cost is practically your only cost with a Lodestar... an extremely low cost indeed!

WRITE US or call your CM distributor for literature, prices and quick delivery from stock.

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CM HOISTS AND CHAIN

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ment for connecting air or steam cleaning lines in the Neville plant is shown in Fig. 1. Steam is supplied by the white jacketed line (extreme left) through a valve into the flexible hose. A coupling connects the flexible hose to one of the insulation coated transfer lines. The steam supply can be switched to any one of the other lines connected to this piping manifold by snapping the coupling off this nipple and snapping it onto any one of the other nipples (circles) on the ends of the various steam inlet lines.

A typical outdoor installation of the flexible hose and coupling arrangement for connecting steam or air lines to the plant's transfer piping is shown in Fig. 2. The fixed steam line connects to the flexible hose by a coupling (circle, extreme left) and feeds through the hose into a transfer line (circle, top center). The same steam line can also be connected to the other transfer line at this location (center circle) by shifting the coupling at the downstream end of the hose onto this nipple.

Carbide Tip Brazing

(Continued from page 117)

of noteworthy economic and performance features:

1—Full flexibility of operation—Burners are adjusted in seconds to permit handling tool shanks of different sizes. One set of burners at each brazing station handles the full range of tool sizes.

2—Highly efficient—Since the gas fuel is always premixed with air, full combustion efficiency is maintained at all times.

3—Atmosphere control—Air:gas ratio is readily adjusted to provide protection against oxidation of the braze area.

4—Speed of heating—Tools are heated to brazing temperature in minutes or fractions of minutes, with full safety.

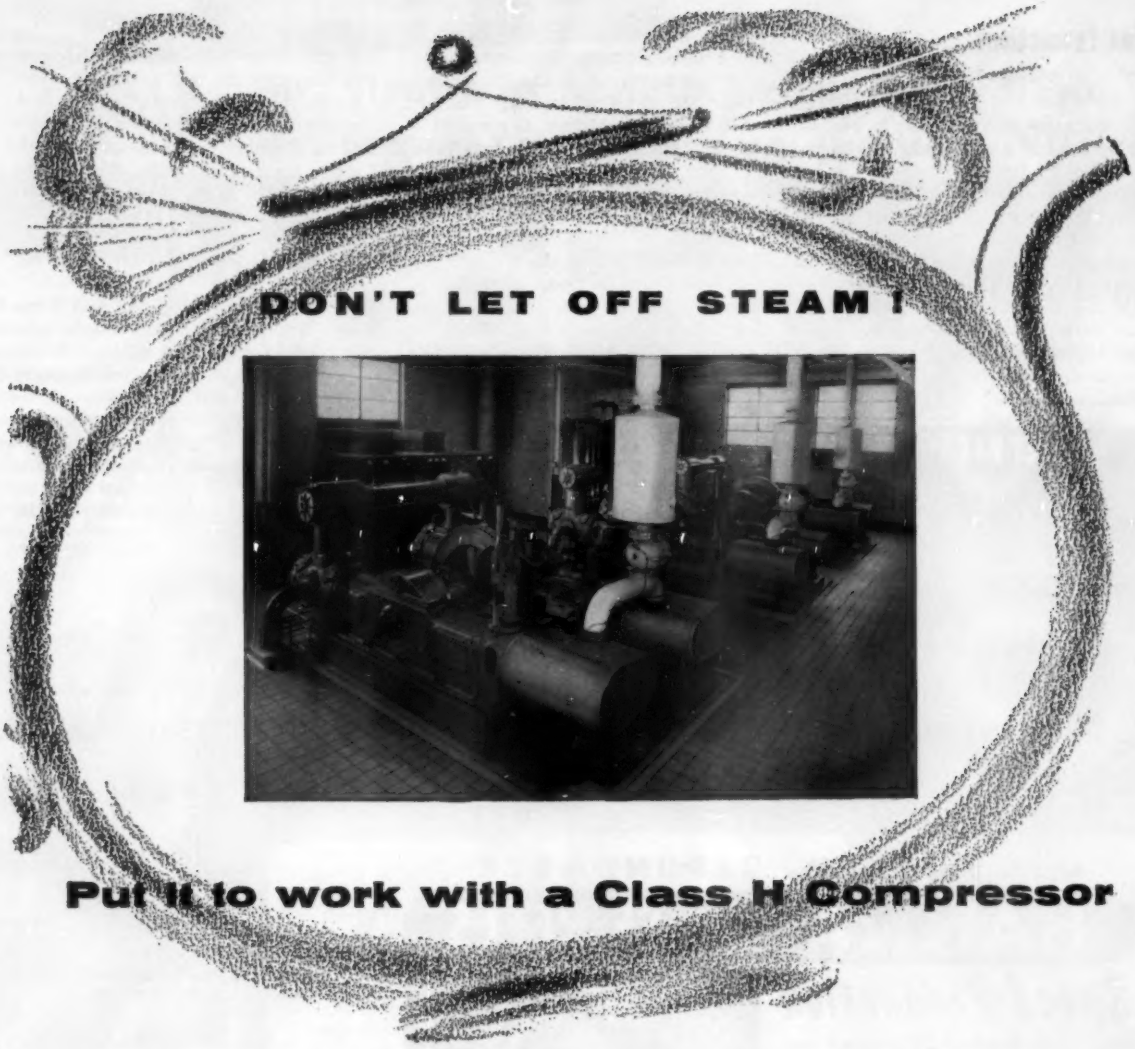
5—Equipment simplicity—Highly skilled operators are not required, and maintenance is readily handled by plant mechanics.

6—Economy—Equipment is low in first cost, and operating costs are almost insignificant.

7—Accessibility—The burners do not interfere with free access to the working surfaces and the operator can wipe-in the tip or brazing material whenever needed.

8—Reproductibility of heat input and protective atmosphere conditions provided by the combustion controller.

9—Automaticity of the equipment permits pre-scheduling of work load according to heat cycle requirements.



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Put it to work with a Class H Compressor

If you can use exhaust steam economically, you can reduce compressed air costs with a dependable CP horizontal duplex Class H steam-driven Compressor. Equipped with steam cylinders properly proportioned to your steam conditions . . . throttling type governor or automatic cut-off for peak economy over a wide range of load . . . and Simplate valves, the Class H affords high economy in pounds of steam consumed per unit of air delivered. Capacities range from 900 to 7,400 cfm. (100-125 lb. air, 200 to 1,250 hp.) Other types and sizes available for lower or higher pressures. For details write *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

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Fan Connections

(Continued from page 94)

As a solution to such a discharge as illustrated by the arrows in Fig. 13.

Such an abnormal condition is bound to affect the fan performance. The fan wheel cannot do its work upon the air, and accordingly, the pressure and volume are lower—Point I, Fig. 14. The horsepower tends to be higher than the curve Point J. If the elbow is rotated 180 deg then the volume and pressure are lower, as indicated by Point I, and the horsepower is lower also, Point K.

The best solution to this problem is to eliminate the elbow entirely by relocation of the fan. Under these conditions the air flow entering the inlet will be in straight lines as required by the fan test code. If this is impossible, moving the elbow five to 10 pipe diameters away from the inlet will allow the air to straighten itself. Failing this, the centerline radius of the elbow should be no shorter than 1½ pipe diameters as illustrated in Fig. 15.

Occasionally space conditions are extremely limited for a ventilating fan with no inlet duct connections. It is necessary to locate the inlet adjacent to the wall, Fig. 16. Sometimes it is necessary to use a double width double inlet fan drawing air out of a ventilation plenum chamber. The width of the chamber is limited and, accordingly, the fan inlets are close to the walls or sheet metal sides of the chamber. A large permanent obstruction of some sort such as a tank, large building column, etc. may restrict the fan inlet.

Any one of these conditions will impose serious restrictions upon the fan's ability to obtain air so that it can meet its design ratings. Laboratory tests indicate that the location of an obstruction to a fan inlet closer than 45 per cent of its wheel diameter begins to reduce the volume and static pressure, Point L, Fig. 17. A safe and easy rule to follow is to make sure all obstacles are more than one-half a wheel diameter away from one or both inlets in the case of a double width double inlet fan, Fig. 18.

"I've never seen a man look forward to vacation as much as he does."

The above discussion reviews the most common of the various types of duct connections to and from a fan. There are variations of these, the effects of which can be traced back to the basic connections. Working knowledge of the effect of these connections will enable both the plant engineer and the fan engineer to ascertain the cause of fan and system discrepancies when they arise.

Low Pressure Steam

(Continued from page 122)

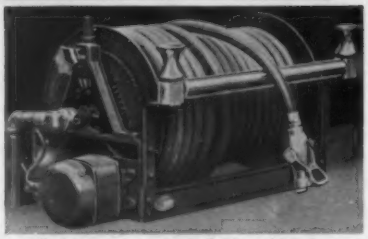
74 ft of 1 in. pipe with 1 in. supply pipe from the main. The coil for each alkali tank will be 48 ft of 1¼ in. pipe with 1¼ in. supply from main.

As a comparison with a working pressure of 30 lb gage, where used, the branch to the coil in each rinse tank

with RUGGED, DEPENDABLE

HANNAY HOSE REELS

Speed Production



When Clark Equipment Co. designed their new plant in Benton Harbor, Mich., efficient materials handling was one of the most important requirements. Gasoline, diesel oil, and hydraulic fluid were *piped* to the end of the assembly line to be put into the big Michigan Tractor Shovels coming off the line.

Hannay Hose Reels, shown above, were selected to handle the supply hose for this important last step. The hose is stored safely and conveniently, and is always ready for instant use because it's always connected to the liquid source. Air motors quickly and safely rewind the hose.

Let us show you how Hannay Hose Reels can help you save time, fuel and hose, and speed production. There is a Hannay Reel to meet your needs.

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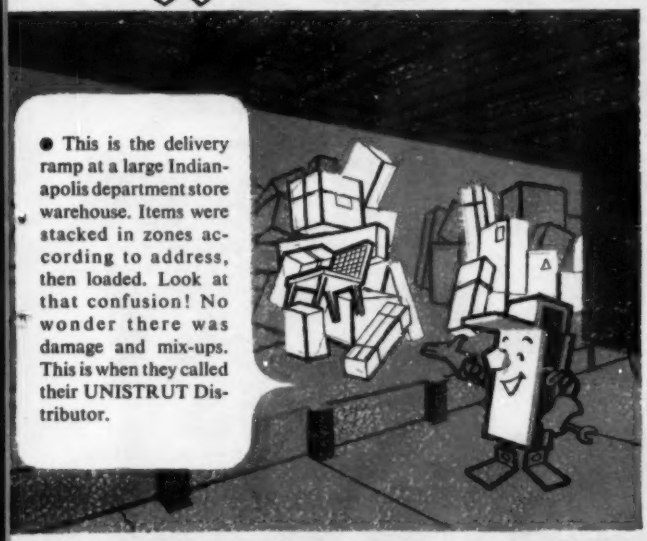
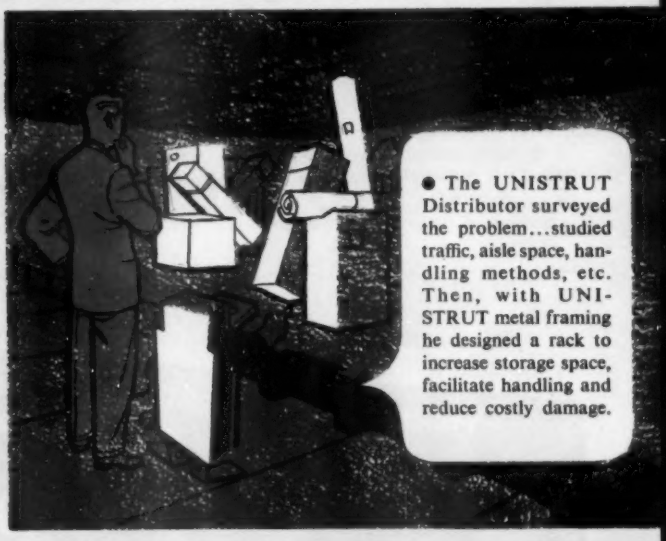
"The Sky's The Limit"

—when you build with UNISTRUT®

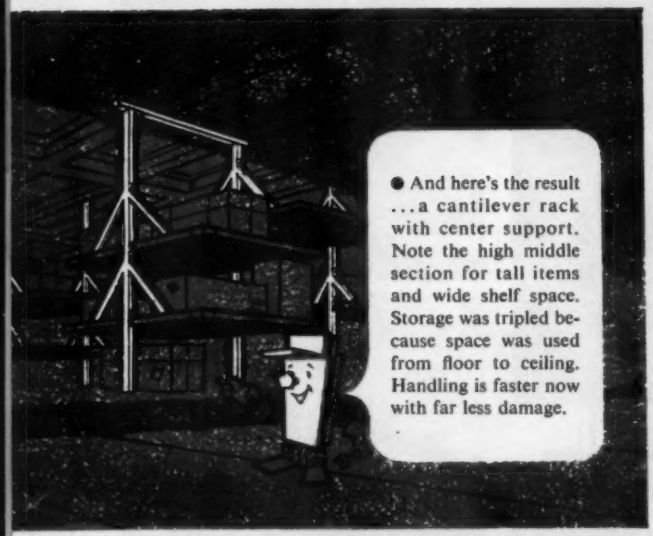
Mr. Strut cuts handling costs for Indiana department store with unique UNISTRUT® rack



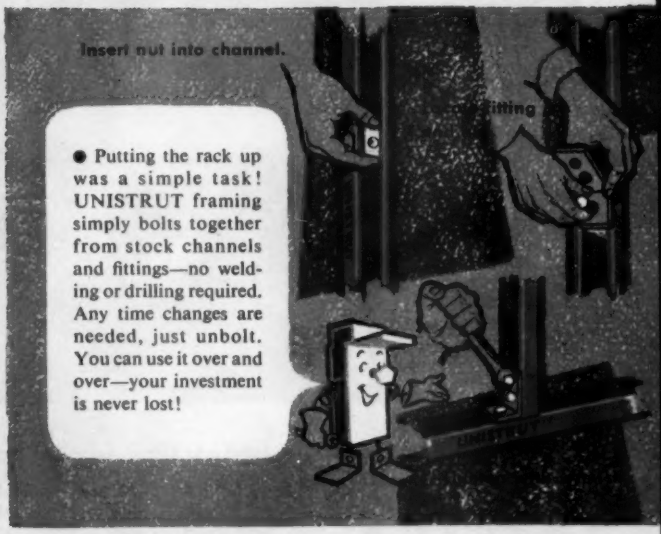
● This is the delivery ramp at a large Indianapolis department store warehouse. Items were stacked in zones according to address, then loaded. Look at that confusion! No wonder there was damage and mix-ups. This is when they called their UNISTRUT Distributor.



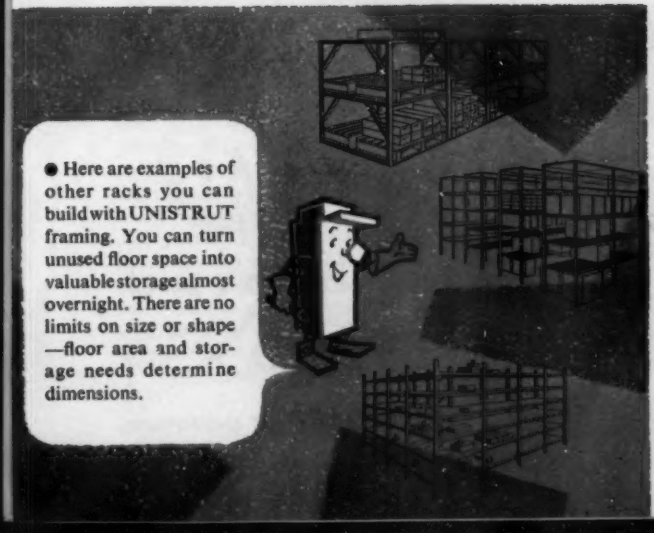
● The UNISTRUT Distributor surveyed the problem...studied traffic, aisle space, handling methods, etc. Then, with UNISTRUT metal framing he designed a rack to increase storage space, facilitate handling and reduce costly damage.



● And here's the result ...a cantilever rack with center support. Note the high middle section for tall items and wide shelf space. Storage was tripled because space was used from floor to ceiling. Handling is faster now with far less damage.



● Putting the rack up was a simple task! UNISTRUT framing simply bolts together from stock channels and fittings—no welding or drilling required. Any time changes are needed, just unbolt. You can use it over and over—your investment is never lost!



● Here are examples of other racks you can build with UNISTRUT framing. You can turn unused floor space into valuable storage almost overnight. There are no limits on size or shape —floor area and storage needs determine dimensions.

Whatever your storage needs, see your UNISTRUT Distributor or mail the coupon for free catalogs and UNISTRUT rack designs. Ask about the new low price of UNISTRUT framing. And be sure to see our latest film, "The Sky's The Limit"—at your UNISTRUT Distributor.

Remember, your UNISTRUT Distributor offers a complete service of design and engineering. He can help you in many ways to reduce costs and provide better storage facilities. Complete warehouse stocks in all principal cities. In Canada, Northern Electric Company.

The World's Most Flexible All-Purpose Metal Framing

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☐ Information on UNISTRUT film, "The Sky's The Limit."

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Company.....

City.....Zone.....State.....

could be reduced to ¾ in. and the coil in the tank to 50 ft of ¾ in. pipe; the branch to each cleaner tank could be reduced to 1 in. and the coil in the tank to 42 ft of 1 in. pipe. The main to the tanks could be reduced to 2½ in.

The boiler capacity will not be reduced by the use of the higher pressure as the same heat ouput will be required.

The advantages of using low pressure steam are as follows:

First: Heating boilers designed for 15 lb maximum pressure can be used which are less expensive than boilers for higher pressures.

Second: A licensed boiler fireman is not required in places where firemen for other than heating boilers must have a license.

The disadvantages of using low pressure steam are:

First: Larger pipes and coils are required and this may require larger tanks to give the necessary working space inside tank coils. These will be more expensive.

Second: The temperature control will be more sluggish because of relatively small temperature difference between steam in coils and contents of tanks.

So many plating room operators have a decided prejudice against the use of low pressure steam for heating plating room tanks that it is often difficult to convince them that satisfactory results can be expected. This is probably because they have seen attempts made, unsuccessfully, to use low pressure steam where piping and coils were originally designed for pressures of 30 lb or more.

With an increase in business, the Interior Steel Equipment Co. has augmented their paint baking facilities. In doing this they have achieved economies in handling of work while maintaining and even enhancing the quality of their products.

They installed a Sly Convectioneered Oven, 45′ long, 9′ 6″ wide, 6′ 9″ high with semi "A" type sheet metal hoods at the exit and entrance ends to form an efficient heat seal. Beneath the oven is a self-contained 2,500,000 BTU per hour direct gas-fired heating unit.

As aids in achieving excellent finishes on the products are: (1) efficient air distribution over the work (2) temperature uniformity in the baking zone (3) correct exhaust conditions to maintain proper oven atmosphere, and (4) a low overall temperature gradient between supply and recirculation temperatures.

This installation is typical of the careful engineering that goes with all Sly Industrial Ovens. *May we discuss your requirements with you?*

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New Equipment, Methods

(Continued from page 109)

Steam Gun, which had aerated grips and a Hy-Vel nozzle and all necessary safety features incorporated in it. The solution used contained 2 per cent hydrochloric acid, necessary to cut the tar, grease and such substances which had been weather beaten and sun baked on the brick. After the dirt was removed the bricks were thoroughly rinsed with the brushes and steam.

Future ravages of weather and grime were then prevented by waterproofing. This consisted of spraying a thin coat of silicone material over the entire surface of the building. This penetrates quickly and deeply into the masonry, but for most surfaces does not change its color or surface characteristics. The Genesee Building & Waterproofing Co. guaranteed this protection for five years.

The ease with which the Albina Stirrups were operated cut time and rigging costs considerably. Both Eastman and the contractor appreciated the safety features of these stirrups, which could be operated with no special experience being required of employees.

In previous cleanings the terra cotta trim on adjoining two- and six-story buildings had been sandblasted and the glaze was partially destroyed. It was therefore decided to remove the remaining glaze by sandblasting, and waterproof the raw stone. Though this changed the color from ivory to tan, a uniform effect was achieved.

A Kodak spokesman said that, while the company was naturally pleased with the fresh appearance of the building after cleaning, there was an added gain in discovering the exterior condition. Such things as the need for pointing, window sills needing repainting, and the need for other small repairs for best protection of the building were discovered. Most of these matters were taken care of as a part of the cleaning job.

A Genesee Company executive said that because of the new machines and equipment used for the work, the whole project was finished in 60 days, instead of the estimated 90, at a considerable savings in costs.

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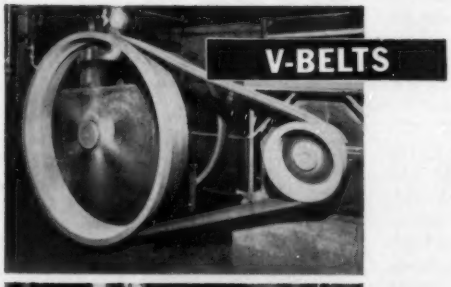
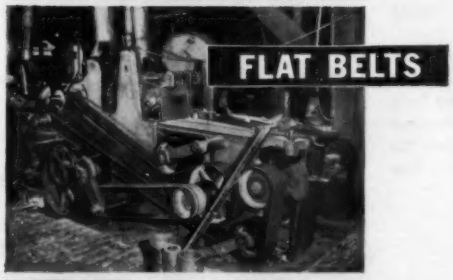
Flat Belts, V-Belts and Sheaves and "TIMING"® Belts and Sheaves





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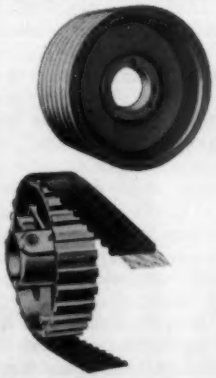

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HALL INDUSTRIAL WATER REPORT

Hall Laboratories, Inc.—Consultants on Procurement, Treatment, Use and Disposal of Industrial Water

Volume 3 APRIL 1955 Number 2

It Takes a Lot of Water Conditioning To Deliver the Kilowatts

Current expansion in the public utility field to supply industry with more power and to bring electrification to greater areas demands careful planning for future water requirements, as well as active attention to existing water uses. Experts in utility station management turn to experts in water management for continuing consultation on water treatment and control.

Hall Laboratories now performs this service for some three hundred utilities, many of them on a system-wide basis.

Design of New Facilities

Constructors of a new utility plant on the West Coast made use of Hall's headquarters engineers in a three-way consultation to centralize information on: water availability and requirements from the plant; water characteristics from Hall field engineer E. R. Lang; and plant design from the constructors. A realistic report on cost and operation of suitable pretreating equipment resulted from the analysis.

The station has recently started operation with continuing supervision of water conditioning practice by Hall Laboratories.

Tailoring Water to Fit a Plant

Another western utility, whose existing plants were operating with Hall Service, withheld a final decision on the location of a new station until an adequate water supply could be developed.

Again, working with the constructors and the client, Hall Laboratories first analyzed samples from all available sources over a time period calculated to include representative conditions throughout the year. One sample was even taken during a flash flood, and provisions made for such extreme conditions.

With the data thus collected and the information on system requirements from the client and constructors, Hall staff engineers S. R. Osborne and A. M. Henricks went to work on recommendations for water treatment facilities. A detailed report covered preparation of water for: recirculating cooling water; cooling water for bearings; feedwater to the evaporator and drinking water. The Hall report included estimated comparative costs of alternative chemical treatments and diagrams indicating all equipment with specifications of capacities to simplify study of the various alternatives.

This power station has just gone into operation with Hall field engineer R. M. Tarr on the job to help plant engineers and chemists set up the exact conditions they need for the best operation of their new facilities.

Minimizing Treatment Costs

In other cases, plant surveys by qualified water-treatment engineers can obviate the purchase of costly equipment.

Hall engineers J. E. Summerville and M. C. Scott worked on a problem of this kind with a southeastern utility plant supplying a large rural area. The plant drew its water from three wells. Soluble iron and iron bacteria in the well water caused iron deposits in the plant water lines, recirculating cooling system and heat exchangers. Lines carrying cooling water to bearings had to be cleaned every three months to prevent complete plugging. Plugging of oil coolers occurred.

Iron removal would have involved a capital expenditure of $20,000 to $25,000 for equipment plus an annual chemical cost of $15,000 to $19,000. When Summerville and Scott estimated comparative cost of $1800 for equipment and $8000 for chemicals to control iron by Calgon® treatment, the plant deferred consideration of the pretreatment facilities.

Later reports showed that the co-operation of the plant personnel in carrying out the recommendations for controlling the iron and organic growths in the system had paid off. The water side of the condenser was free of deposit, the cooling tower was in good shape and oil coolers no longer plugged. Organic growth was under control.

* * *

Delivering kilowatts to all types of customers is the business of electric power stations. By adding the broad experience of Hall Laboratories to the specific knowledge of their own technical staffs, these companies feel better prepared to keep water troubles from interfering with production of power.

Boiler Feedwater Studies

Hall Laboratories participated in two papers sponsored by the Joint Research Committee on Boiler Feedwater Studies and presented at the 1954 annual meeting of the American Society of Mechanical Engineers in New York. M. D. Baker of West Penn Power Company and V. M. Marcy of Hall reported on "Hydrazine As An Oxygen Scavenger—A Progress Report on Tests at Springdale Station." J. D. Ristroph of Virginia Electric and Power Company and E. A. Yorkgitis of Hall presented a paper on "Controlling Iron and Copper Pick-Up with Neutralizing Amines." Preprints of the papers are available in limited quantities from the A.S.M.E. under No. 54-A-271 and No. 54-A-262, respectively.

Industrial Water Problems Require Special Handling

There are no "stock answers" to industrial water problems. For information, write, wire or call Hall Laboratories, Inc., Hagan Building, Pittsburgh 30, Pa.

Water is your industry's most important raw material. Use it wisely.

For more facts circle 650 on Reply Card

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BULLETINS

(Begins on page 21)

151 **Motorized Valve Assemblies**—Technical data on industrial motorized valve assemblies is presented in 6-pp Bulletin 8506. Information on selection of valve bodies, linkages, and power units is offered, along with references to other sources of data on the subject. A list of available valve body and electric operator combinations in tabular form is included. Industrial Div., Minneapolis-Honeywell Regulator Co.

152 **Valves for L-P Gas**—Design and construction features of valves designed for positive control of L-P gas are described in illustrated Form 1002. Applications, pressure-temperature rating and general dimensions are included, along with photos of typical applications. The Ohio Injector Co.

153 **Cushioned Valves** — Double cushioned electric check valves designed to solve problems commonly associated with check valve installations are presented in 8-pp technical Bulletin W-10. Comprehensive in its coverage of pertinent data, bulletin includes dimensions, cross-sectional drawings with parts list, suggested wiring diagrams and specifications. Golden-Anderson Valve Specialty Co.

154 **Valve Comparison Chart**—Valuable in specification, ordering, and using bronze and iron-body valves, this chart (20 pp) lists figure numbers of valves that are equivalent in application, notes major differences in construction. It provides simple, easy to read tables detailing company's line of bronze and iron-body valves compared with valves of other leading manufacturers. The Fairbanks Co.

155 **Fluid Control Valves**—Needle valves, toggle valves, plug type valves and packless diaphragm valves are described and illustrated in 12-pp Bulletin 3037. These valves are designed for use in instrumentation, pharmaceutical work, air circuit applications, vacuum systems and pressure flow control. Booklet provides suggestions on application of valves shown, discusses major features and includes sizes. The Imperial Brass Mfg. Co.

156 **Pipe Connections**—Catalog 55, 12-pp, describes a line of pipe connections, unions, and bleeder valves. Discusses all-steel sealing with pressure-aided seat incorporated into a pipe connection and union with ranges from ½ to 12 in. and vent-drain-bleeder. Descriptions are given of applications which simplify and improve piping systems, as well as test results. Book also gives data on construction, operation, specifications, dimensions, pressure ratings, prices. Gray Tool Co.

BOILERS

158 **Steel Boilers**—Revised General Catalog 80, 32-pp, is a condensed but complete product guide on company's high and low pressure steel boilers. Also included are full descriptions and illustrations of water heating products, both direct fired and storage types as well as indirect water heating coils. Pages on boiler support brackets, structural steel suspension and induced draft fans, as well as pictures of installations are included. Kewanee-Ross Corp.

159 **Self-Contained Boilers**—Brochure AD-137 covers company's LR and CB models of self-contained boilers. Compactness in design is illustrated and advantages of the units listed. Suggested boiler room layout and dimensions are included. Cleaver-Brooks Co.

PUMPS, COMPRESSORS

160 **General Purpose Pumps** — Bulletin 08B8233 describes Type KS pump, developed for air conditioning and general purpose applications. Points out construction features with the aid of a cut-away drawing, and includes bearing details. Allis-Chalmers Mfg. Co.

161 **General Purpose Pumps**—Section B, 36-pp, describes rotary pumps for general purpose use. Explains positive displacement principle incorporated, gives suggestions for selecting proper materials of construction. Application and ordering information is provided on mounted and unmounted small pumps, large mounted pumps, pumps for operations requiring greater sealing, and large, totally enclosed models. An engineering section covers recommended speeds and capacities. Viking Pump Co.

162 **Centrifugal Pumps**—In Selection Charts and List Price Sheet CSP-155, 8-pp, are capacity charts and dimensions to aid in selection of company's centrifugal pumps, as well as price list for available models. Photos and diagrams are provided. Bell & Gossett Co.

163 **Seal-less Centrifugal Pump** — Bulletin 1010, 16-pp, presents detailed data on company's line of seal-less centrifugal pumps. Gives information on sizes, horsepowers, heads and capacities, dimensions, materials of construction, design data, construction features and direct user benefits. Three new models are introduced, with design and construction information. Pumps covered range in size from ¾ to 7½ hp, capacities to 250 gpm. Chempump Corp.

164 **Centrifugal Pumps** — Packingless self-priming centrifugal pumps are discussed in 12-pp Bulletin G-1. Explains how pumps are designed to provide an effective seal without packing. Provides instructions for installation and care of these pumps, as well as operating information. Booklet features a pump for both flooded suction and suction lift operation, also gives data on a pump which cannot be used with a positive head on the suction. The LaBour Co., Inc.,

165 **Steam Pump**—Bulletin 230 describes a horizontal duplex steam pump with piston valve steam chest. Explains advantages of this construction, including high recovery of fuel cost when exhaust steam is utilized. Provides sectional and exterior views of the pump, also specifications, capacities and dimensions. Warren Steam Pump Co., Inc.

166 **On Cooling Tower Pumps**—This 8-pp bulletin is a six-step manual for sizing cooling tower pumps and piping Patterned after procedure used in company's handbook, by means of six simple steps, the most efficient and economical selection of cooling tower pumps and piping can be made. A selection chart and price list is included, and typical cooling tower installations are diagramed. Bell & Gossett Co.

167 **Non-Portable Compressors**—Publication RP-125 is an article on non-portable compressors, their installation and maintenance. Covers such topics as location; foundation shaking forces; soil considerations; foundation suggestions; piping; location of inter-and after-coolers and receivers; temperatures; lubrication, inspection, information. Worthington Corp.

168 **Heavy-Duty Compressors**—Bulletin 601, 6 pp, introduces this company's Class ATH horizontal, double-acting, heavy duty water-cooled air and gas compressors of the sectionalized cylinder type. Text stresses their long-time low-cost service, other advantages. Explains how the new design requires less cooling water and lower horsepower. Construction features are described, illustrated; sizes given. Pennsylvania Pump & Compressor Co.

METALS

169 **Data on Cast Iron** — Bulletin A-71, 64-pp, features applications of Ni-Resist, corrosion resistant nickel alloyed cast iron, in nine specific industries as well as in general industrial uses. Tabulates mechanical and phyisical properties offered by the eight types of Ni-Resist. Section on corrosion data shows superiority of this material under various industrial conditions. The International Nickel Co., Inc.

170 **Non-Ferrous Forgings**—Various types of forgings produced by this company from non-ferrous forgings materials including copper, copper base alloys and aluminum alloys are illustrated in this 6-pp bulletin. Forgings data, including nominal composition of the alloys, typical mechanical properties, electrical conductivity, commercial tolerances, and government and engineering society specifications are included. Forgings Div., Scovill Mfg. Co.

TOOLS, WELDING, MACHINE SHOP EQUIPMENT

171 **Welding Equipment** — Catalog 9-13, 36-pp, covers a complete line of arc welding and oxy-acetylene welding supplies and accessories, featuring product descriptions and specifications. Included are welding rods, fluxes, brazing alloys, goggles, helmets, shields, electrode holders, protective clothing, cable, clamps, hose, lighters. Air Reduction Sales Co.

172 **Welding Machines**—This 54-pp catalog describes a wide variety of welding machines, automation machines and special machine tools. Forty-six individual types of automatic welders for submerged arc, resistance and Heliarc welding operations are described and illustrated. Automatic assembly and automatic nut torquing machines are described, as well as special machine tools including horizontal and vertical boring machines and drilling and tapping machines. Expert Welding Machine Co.

173 **Tools for Welding**—This 40-pp illustrated catalog describes company's standard and special tooling, fixtures and machinery for high quality, high speed, low cost welding. Includes examples of special purpose automatic welding machinery using submerged arc and inert arc (MIG and TIG) processes. Illustrations, descriptions and specifications are given for all models. Cecil C. Peck Co.

174 **Bronze Electrode Chart** — Comparative Chart 54D-203 lists known brands of aluminum bronze, phosphor bronze, nickel-aluminum bronze and manganese bronze electrodes for use in electrode selection. Ampco Metal, Inc.

175 **Brazing Manual**—Concerned with application of the major brazing methods in joining metals using silver alloys and filler metals, fluxes, and gas atmospheres, this 22-pp brazing manual (Catalog 925) contains over 20 tables, drawings and photographic illustrations. Subjects discussed include silver brazing procedure, selection of brazing and filler metals, design of brazed joints, prebraze cleaning, assembly of joints. Air Reduction Sales Co.

176 **Cutter and Tool Grinder** — Illustrated Catalog M-1852, 20 pp, introduces manufacturer's No. 1 cutter and tool grinder, a general purpose unit for handling most requirements of average metal-working shop. Ease of movement afforded, 360-deg wheelhead swivel, curtain type dust guards, high accuracy, operator convenience, and other advantages and design highlights are described. A keyed illustration shows operating controls and construction details. The Cincinnati Milling Machine Co.

To order these bulletins circle item numbers on the handy Reader Service Cards provided on the facing page.

177 **How to Straighten Pipe and Tube**—Technical Bulletin 55, 24-pp, covers the subject of straightening ferrous and non-ferrous pipe and tube, reviewing recent uses for tubing. Reasons for having straight tube prior to forming and fabricating operations are presented. Several pages analyze basic straightening methods—two plane vs. rotary machines. Detailed explanation is given on merits of rotary straightening. Discusses adjustment and operation of straighteners; design and use of entry and delivery tubes; flood lubrication; single and multi-speed drives vs. variable speed drives. Mackintosh-Hemphill Co.

178 **Hydraulic Equipment**—Illustrated Bulletin HY-55, 28-pp, describes hydraulic equipment ranging from 17½ ton pullers to 100 ton presses. Catalogs data on several sizes of Power-Twin rams. Listed as well are specialized sets designed to handle maintenance jobs in many fields using Power-Twin as the basic power unit. Also shows many service operations involving the hydraulic removal and installation of gears, bearings, pulleys, wheels, bushings, sprockets. Specifications and data on pumps for operating the equipment described are also included. Owatonna Tool Co.

179 **Single-Point Presses**—Technical data on company's line of single-point presses is presented in Bulletin 2019-A. Tabulated information on construction, operation, safety, and maintenance is included, along with specifications. The Cleveland Crane & Engineering Co.

180 **Colloidal Graphite**—Bulletin 421 contains photos, diagrams, charts, and general information on the advantages offered by col-

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loidal graphite in the assembly and run-in of machines. Shows how to use collodial graphite, chiefly in the form of a petroleum oil dispersion. Acheson Colloids Co.

METAL FABRICATION AND FINISHING

181 **Pickling Aids**—Three new pickling aids, plus an improved version of a heavy-duty inhibitor are described in this bulletin. The two new products described are a foam-producing pickling inhibitor especially useful where bright work is desired, and a cationic foam-producing chemical usable in any concentration. It affords fast acid penetration into scale layer and promotes speedy rinsing. E. F. Houghton & Co.

182 **For Sheet Metal Fabrication** — Now available to plant engineers is comprehensive 142-pp Catalog 55 covering practically every type of sheet metal machinery, and hand tools, too. Fully illustrated, catalog includes detailed diagrams, charts and tables for handy reference and information. Provides specifications and sizes. Book is indexed. Federal Machinery Co.

183 **Industrial Cleaners**—Five cleaning compounds are described as to features, use and suggested applications in this revised bulletin. They include two liquid steam cleaning compounds; a concentrated liquid for cleaning greasy or dirty surfaces where steam cleaning is not practical; a solvent degreaser; and a rust and scale solvent. Brulin & Co., Inc.

184 **On Vapor Degreasing**—Principles and operation of the vapor degreasing process and three basic types of vapor degreasing machinery are described in this 12-pp pocket-size booklet. The solvent cycle is illustrated by a schematic diagram. Metalwash Machinery Corp.

185 **Tumble-Type Blast Cleaner** — Eight-pp Bulletin 124-B features an airless blast cleaning machine employing tumbling principle in conjunction with hurling of abrasives. Individual sections are devoted to a discussion of airless abrasive blasting in general; component parts of the cleaner; electrical, mechanical and size specifications; installation views of machines, plus photos of typical parts being processed. American Wheelabrator & Equipment Corp.

186 **Mineral Shot**—Characteristics and performance of non-metallic, dustless mineral shot for blast cleaning are described in this illustrated bulletin. Savings in production time, material costs, and blasting-equipment maintenance in foundries, aircraft plants, metalworking shops are described. Baldwin-Hill Co.

187 **Barrel Finishing**—Basic steps involved in making trial processing runs, and recommendations for selection of media and compounds are given in this 10-pp manual on barrel finishing. Also lists specific recommendations for barrel speeds, water level, time cycles and barrel loading; lists 11 of company's brand compounds and the specific uses of each. Minnesota Mining and Mfg. Co.

188 **Economical Masking**—This 6-pp illustrated folder gives practical tips on how to save time and cut costs in spray painting and other metal finishing where masking is necessary. Cites actual case histories with photos of applications using company's pre-cut protective masks. W. H Brady Co.

PLASTICS

189 **Glass-Reinforced Plastics** — Bulletin GRP-1, 12-pp, offers technical data on custom-molded parts of glass-reinforced plastics. High-pressure molding techniques, which permit economical production of complicated shapes with metal inserts, are described. Data on matched-die metal molding for mass production of relatively simple shapes with uniform cross-sections, are also given. American Hard Rubber Co.

190 **PVC Material**—Bulletin 4B presents facts on all forms of Boltaron polyvinyl chloride. Gives mechanical, electrical, thermal and other properties of this material; shows chemical resistance to a wide range of reagents. Forms in which Boltaron is available are listed and pipe fittings shown. H. N. Hartwell & Son, Inc.

191 **Quality Control for Welded Polyethylene**—The availability and simplicity of certain key tests enabling polyethylene fabricators to assure soundly constructed process equipment is stressed in this illustrated technical bulletin. Describes three effective methods of testing defects in polyethylene welds and records pertinent results. American Agile Corp.

WATER TREATING

192 **Handbook on Demineralizing**—Comprehensive 40-pp Bulletin 5800-B compares various methods of water treatment, indicating the comparison between demineralizers and evaporators. It discusses the characteristics of the various types of available cation and anion exchange materials and offers data on operating costs of demineralizing. It tells when to use 2-bed, 3-bed, 4-bed, mixed or mono-bed demineralizers. It also indicates when decarbonators or vacuum deaerators are required. The bulletin is replete with typical flow diagrams, photos of installations. Cochrane Corp.

193 **Hot Process-Zeolite Treatment**—Technical Reprint T-128, 6-pp, describes boiler feedwater treatment in a steel mill. Discusses problem raised by an expansion in power-generating facilities and solutions for them. There is a comprehensive explanation of the mill's operations. Graver Water Conditioning Co.

OTHER EQUIPMENT

194 **Utility Fans**—Bulletin DS-348U, 24-pp, describes company's redesigned and expanded line of utility fans. Lists advantages of the belt-driven and direct-drive centrifugal fans, their construction features, and special features for specific types of applications. Fan selection

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BULLETINS

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data, capacity tables, roughing-in dimensions, and specifications are included. The Trane Co.

195 **Unit Heaters**—Construction, application, selection and performance data on gas-fired unit heaters are presented in 12-pp Bulletin 655. Cutaway and outline drawings illustrate features of the heat exchanger, the burner and other component parts. Dimensions, weights, capacities, and suggestions for locating unit heaters are covered in detail. Modine Mfg. Co.

196 **Slide Rule Ordering Guide**—Application and ordering information on metal slide rules is provided in illustrated Catalog 164-A, 32 pp. Rules shown range from simple basic units through standard scale arrangements to the advanced dual-base log vector hyperbolic model. Also presented in the catalog are slide rules for special applications. Pickett & Eckel, Inc.

197 **Data on Varnish** — Reference 10-238 give preliminary data on Sylkyd 1400 varnish, a heat-stable modified silicone, dipping and impregnating varnish for producing more durable Class B electrical equipment. Tells applications, gives properties, information on moisture and solvent resistance. Dow Corning Corp.

198 **Hydraulic Cylinders**—Eight-pp Bulletin H-104 K contains latest data on company's line of heavy-duty, 2000 psi high pressure hydraulic cylinders in 1½- through 12-in. bores, up to 22-ft strokes and 19 mounting styles. Provides design, engineering, construction, mounting, dimensional, and operational data, and is illustrated. Miller Fluid Power Co.

199 **Trough for Tubing**—Bulletin 1254-D, 8 pp, introduces Tubetrof, a new simplified standard system for supporting instrument tubing which offers savings in design, fabrication and installation. Bulletin discusses these and other advantages offered, describes and illustrates the trough, covers, and fittings. Includes sizes. P-W Industries, Inc.

200 **Data on Insulations**—Insulation solutions for a wide range of temperature problems are chartered in this folder. Provides brief descriptive information and tells forms available for high temperature applications, for intermediate temperature use, for hot and cold water and low pressure steam, for ice water and frigid temperatures. Mundet Cork Corp.

201 **Seals for Mixers** — Eight-pp Bulletin B-111 details advantages of rotary mechanical shaft seals for company's Lightnin Mixers. Describes and illustrates design features of the seals and explains their application to mixing equipment. Provides data on double- and single-seal assemblies, illustrates simple procedure for replacement. Includes information on seal lubricating and cooling systems. Mixing Equipment Co., Inc.

202 **Industrial Tapes**—Sixteen tape samples are mounted in this descriptive catalog, and each tape is described as to composition and use in industry. Specification figures are shown for backing, thickness in mils, adhesion, tensile strength, tear resistance, dielectric strength, and electrolytic corrosion resistance. Six industrial applications — bundling, tube sealing, thread protection, aperture sealing, protection, and bolding—are described. Polyken Products Dept., The Kendall Co.

203 **Air Power System**—Form 213-A, 6-pp, discusses power losses in compressed air lines and tells how to find out whether more air is being wasted than repair and renovation of the distribution system would cost. Gives procedures to be taken to bring system up to accepted standards. Of value in the design of new systems are diagrams of different types of piping networks and tables of friction losses of air in pipe, fittings, hose. Ingersoll-Rand Co.

204 **Weed Killer** — Performance and properties of Tronabor, a borate weed killer, are outlined in this Service Bulletin 2W. Describes product's use under asphaltic paving in parking areas and similar applications. American Potash & Chemical Corp.

205 **On Hydrant Selection**—Manual 54-5, a 16-pp catalog on non-freezing ground and wall-type hydrants, is designed to help plant engineers select the correct hydrant for the installation. Pictured and described are wall installations, post and box type and encased hydrants. Contains hose and pipe sizes, engineering drawings, roughing-in dimensional data, uses and specifications. J. A. Zurn Mfg. Co.

206 **Employee Training**—"How to Train," fourth in a series on cost reduction, deals with various facets of training both plant and supervisory personnel. In this 12-pp booklet such subjects as when to train, whom to train, who should do the training and what to teach are explained in detail. One chapter outlines steps in the training program—preparation, presentation, application and follow-up. A job analysis sheet is included. Wheeler Associates, Inc.

208 **Power Units** — Eighteen heavy-duty power units from 55 to 190 hp are covered in this illustrated 12-pp bulletin. Describes each model and gives specifications on each. Tables listing horsepower ratings for carbureted and diesel power units are included. International Harvester Co.

209 **Flowed-in Gasketing** — A fast, money saving method of industrial gasketing designed to eliminate hand assembly is explained in this 12-pp illustrated booklet. Photos contrast hand methods with that of the Darex semi-automatic machine in which only two hand motions are necessary. Shows ways in which process is used. Dewey and Almy Chemical Co.

210 **Jet Apparatus**—Bulletin J-1, 12-pp, is designed to help plant engineers select jet apparatus for specific requirements. Includes basic information on the jet principle, jet apparatus terminology, and data on jet construction, operation, and the advantages offered. Various functions performed by jet apparatus are outlined, types best suited for each function identified, and each type described. Includes sectional drawings of typical units Schutte and Koerting Co.

211 **Steam Condensers**—Some recent additions to this company's power plant condenser installations are pictured and described briefly in this 24-pp booklet. Also included are an engineering section on condenser design factors, and sections devoted to air removal equipment to steam condenser specialties, and to maintenance services available. Condenser Service & Engineering Co., Inc.

212 **Industrial Vacuum Equipment** — Illustrated Bulletin 155, 12-pp, describes stationary and portable vacuum equipment for industrial applications. Included are a table for rough calculation of horsepower requirements, an outline of latest methods of automatic and hand dumping of refuse, a section on the application of vacuum to machine design, and illustrations of special vacuum tools. Installation data on the use of vacuum for conveying, servicing equipment, bench work, reclaiming materials, and picking up liquids are also given. The Spencer Turbine Co.

214 **Tubing Guide** — Eight-pp Bulletin 40 condenses pertinent information on selection and applications of 46 principal analyses of tubing. Groups these into five classifications—stainless steel, nickel and nickel alloys, carbon and alloy steels, beryllium copper and titanium. A summary of principal properties of each and its normal production limits given. Properties of six glass sealing alloys are included. Describes manufacturing processes of tubing and lists length limits, straightness tolerance, temper designations and commercial tolerances applicable to size ranges. Superior Tube Co.

DATA FILE of literature for the plant engineer's library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent data file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided for you on pages 213-214.

LUBRICANTS, LUBRICATION

301 **Bearing Lubrication**—Vol. XL, No. 10 of this company's Lubrication magazine provides an excellent 12-pp article on industrial bearing lubrication. Illustrated with photos and drawings, text covers such subjects as bearing design; bearing surfaces; bearing overhaul; aspects of lubrication, including factors involved in choice of turbine oils and diesel lubricants, and the effects of moisture; and the life expectancy of bearing lubricants. The special requirements of porous bearings are also discussed. The Texas Co.

302 **Centralized Lubrication**—Pocket-sized 24-pp, Form 34-22, called "Ask Anyone in Industry" describes in comic-book form the hazards and inefficiency inherent in conventional lubrication practice and promotes use of centralized lubrication—in the form of Alemite Accumeter measuring fittings. Shows how these are connected by tubing to a lubrication pump controlled by an automatic timer. Alemite Div., Stewart-Warner Corp.

303 **Spray Lube System**—This 8-pp illustrated bulletin describes company's method of single and multi-point application of liquids to a wide range of metal cutting and forming operations. Tells how it works and records results of various tests, as well as pointing out advantages. C. A. Norgren Co.

304 **Long-Lasting Lubricant**—Technical information and performance data on company's "41" grease, a silicone fluid-carton black mixture for high temperature, slow speed bearings are provided in this 6-pp brochure. Presents illustrated case histories detailing savings in relubrication schedules, replacement and maintenance costs. Specifications and typical properties are also given. Dow Corning Corp.

305 **Proper Lubrication**—Presenting proper lubrication as the life blood of all machinery, 36-pp Lubriplate Data Book 54-1 is a helpful treatise on modern lubrication practice. Gives product data on both oil type lubricants and greases and discusses choice of lubricants for use in applications involving heavy loads, high speeds, extreme temperatures, water conditions and other metal working. Provides tables of specific recommendations for various classes of equipment used in chemical processing, metalworking, other industries. Lubriplate Div., Fiske Brothers Refining Co.

VALVES, TRAPS, PIPING AND ACCESSORIES

306 **Choosing the Right Valve**—Presenting valve selection as a matter of matching the valve's service characteristics with the service requirements of the job, this practical 20-pp booklet explains and illustrates basic design features of gate, globe and check valves. It tells in non-technical language, how each of these valve types works, and where it is best suited for use. Disc, stem connection, bonnet and bonnet-joint characteristics are also discussed and the importance of stem operation is treated. Crane Co.

307 **Unions, Check Valves**—Illustrated Catalog 55, 24-pp, describes and provides ordering information on a line of forged steel unions and check valves. Socket-weld, high-speed, orifice, O-ring and other unions are included. Catalog provides service recommendations, dimensions and list prices. Also included is table covering discharge of water to atmosphere. Clayton Mark & Co.

308 **Pressure Reducing Valves**—New 6-pp Bulletin W-3 completely describes G-A cushioned water pressure reducing valves, which automatically reduce an existing high pressure to a predetermined low pressure. The installation, operation, adjustment, servicing, and specifications are fully covered. Golden-Anderson Valve Specialty Co.

309 **Hydraulic Control Valves**—Eight new hydraulic control valves with ball detent for position locking are described in 26-pp Section

Uniflex Aluminum Roof Coating

reduces interior temperatures for Ranco, Incorporated

Corrugated metal quonset-type buildings of Ranco, Incorporated, Delaware, Ohio. They are coated with Uniflex Aluminum Roof Coating, manufactured by the Acorn Refining Company, Cleveland, Ohio. Painting Contractor Bahl Painting Company, Columbus, Ohio.

Aluminum roof coating was applied to these metal quonset-type buildings during a period of extremely hot weather. Employees noticed an immediate lowering of interior temperatures, resulting in more comfortable working conditions.

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Aluminum roof coating like this contains asbestos fiber in an asphalt base, pigmented with highly polished flakes of ALCOA Aluminum. Once applied, it remains firm on the surface, but soft and pliable beneath its protective, reflective shield of aluminum. It will not sag or run under scorching sun rays, nor crack under frigid cold. It has insulating qualities unexcelled by any other type of roof coating, as the above story vividly illustrates.

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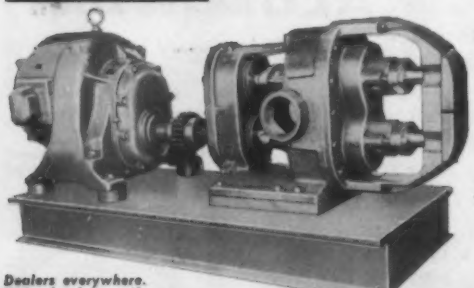

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DATA FILE

(Begins on page 218)

4 of this company's Catalog 200. Included are six three-position, four-way valves, and two two-position, four- and three-way valves. Dimensional data and typical circuit diagrams are provided. Logansport Machine Co., Inc.

310 **Valves and Fittings**—Illustrated Catalog 47 provides over 60-pp of ordering information and application data on valves and fittings made of stainless steel and other corrosion resistant alloys designed for use where corrosion or contamination are factors. Gate, globe, and angle valves for a wide range of services are presented, also needle valves, sampling valves, screwed and flanged fittings. Design and construction details are shown. Also included is a chart of first and second recommendation of alloys for corrosive media. Alloy Steel Products Co., Inc.

311 **Valve Installation Tips**—Comprehensive instructions on proper way to install company's Line Blind valves are given in this pocket-size 24-pp manual. Concisely written, the booklet is illustrated with cartoon-type drawings. A separate section is devoted to trouble shooting for faulty-installation techniques along with recommended corrective procedures. While dealing primarily with Line Blind valves, this information can be applied also to gate, globe and plug valves. Hamer Oil Tool Co.

312 **Plastic Pipe Valves**—This 6-pp bulletin describes tough, corrosion-resistant Dur-Ace plastic pipe fittings and valves. Gives properties of Dur-Ace and includes table showing resistance to more than a hundred chemicals. Standard sizes and pressures of pipe are given, also sizes, weights, prices on pipe and fittings, diaphragm valves. American Hard Rubber Co.

313 **Bronze Valves**—Globe and angle bronze valves with rising stems, union bonnets and stainless steel plug type seats and discs are described in this bulletin. Discusses design advantages, gives dimensions. Walworth Co.

314 **Reduced Valve Engineering Data**—Bulletin 962 explains how the contour of a pressure reducing valve contributes to efficiency of performance. Discusses straightline flow, tight closing. A. W. Cash Co.

315 **For Quick Valve Selection**—Here's a 20-pp catalog digest providing ordering and application information on gate, globe, angle and check valves in bronze, iron, cast and forged steel construction, also valve accessories and parts. Illustrated, includes pressure-temperature chart. The Ohio Injector Co.

316 **Automatic Regulators**—Illustrated information on 12 basic control valve types used in chemical process industries, power generating facilities, and in liquid or gas pressure control applications requiring precise instrumentation by automatic regulators is presented in this bulletin. Reducing valves, pump governors, relief valves, temperature regulators, float valves, damper regulators, combustion control valves, and boiler feedwater regulators are among the items treated. Atlas Valve Co.

317 **Valve Maintenance Guide**—"Prevent Valve Failure Before It Starts," is a 28-pp text on valve selection, installation, inspection. Pictures damaged valves, explains how damage could have been prevented, discusses maintenance schedules, inspection jobs, lubrication, pipe line checking, threading, regrinding, disc replacement. Jenkins Bros.

318 **Steam Trap Book**—Catalog J, 44 pp, includes physical data and prices on cast semi-steel and forged steel inverted bucket steam traps, compound steam traps and ball float air and air relief traps; a handbook section explaining how to calculate condensate loads and select traps for all classes of equipment; a maintenance section. Armstrong Machine Works.

319 **Steam, Air and Gasoline Traps**—Catalog 751, 32 pp, is a recently issued trap ordering book with capacity tables, installation diagrams, and containing charts and formulas for determining proper size trap for specific applications. Covers thermostatic steam traps, expansion steam traps, weight-operated traps for steam, air, gasoline, pressures up to 1500 lb. separators. W. H. Nicholson & Co.

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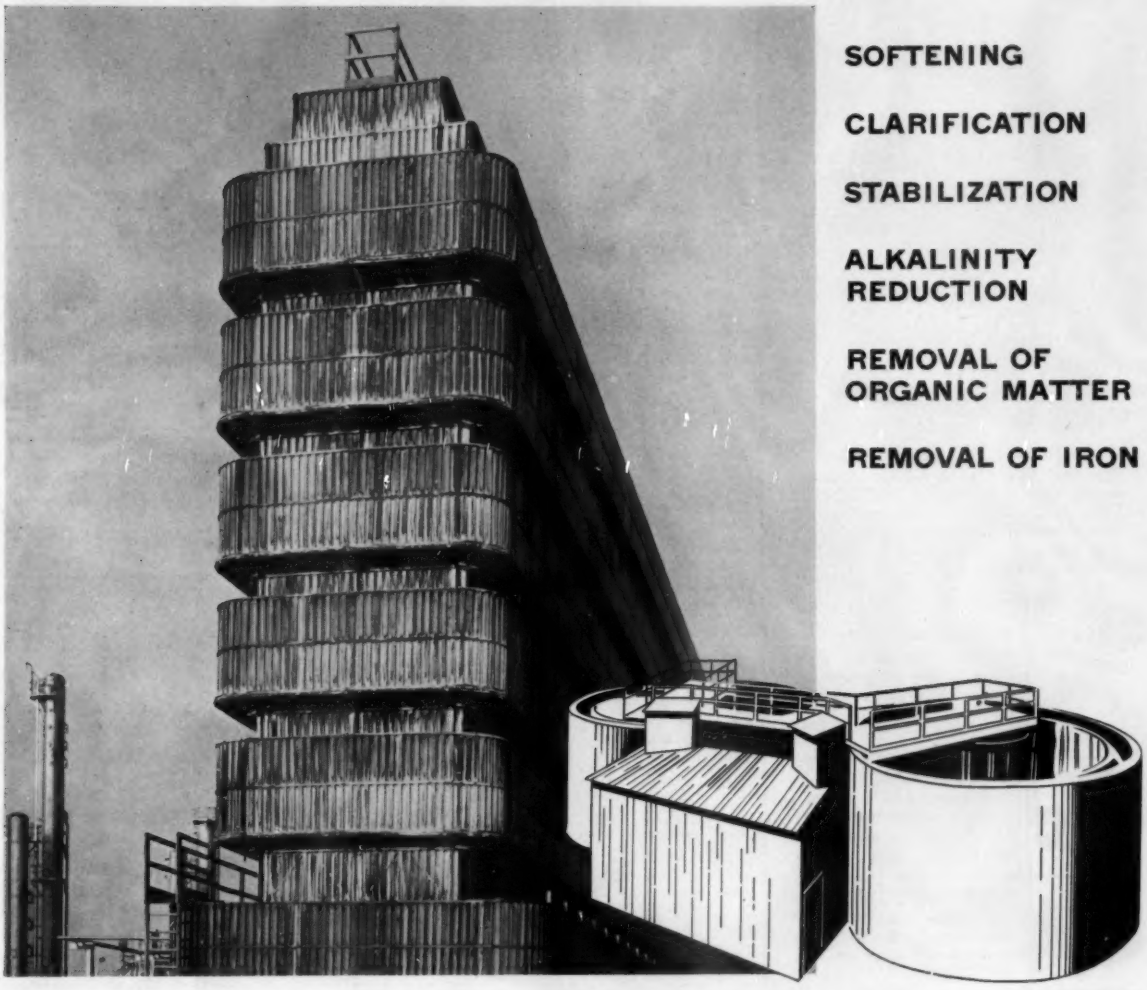

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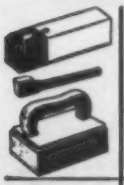

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DATA FILE

(Begins on page 218)

320 **Stream Trap Solutions**—Bulletin F.151 36 pp, is the newest edition of this company's well known booklet, "Solving Steam Trap Problems." Organized for easy reference, this illustrated booklet provides specifications and capacities of steam and float traps, air release valves, pipe line strainers. Tells how to calculate condensation loads and select traps for unit heaters, jacketed kettles, submerged surfaces. Gives pointers in installing and servicing traps. Also included in this edition is information on combination float and thermostatic traps. The V. D. Anderson Co.

321 **Steam Trap Reference Manual**—Bulletin T-1740, 24 pp, tells why and where steam traps should be used; explains desirable trap features. Advantages of company's impulse steam traps are described, their operation illustrated. How to figure trap sizes and how to size condensate return lines are told and capacity and pipe dimension charts and thermodynamic properties of saturated steam included. Yarnall-Waring Co.

322 **Wrought Iron for Piping**—This 32-pp booklet covers commonly used pipe materials and method of selecting them for specific types of service in modern building construction. Discusses wrought iron, cast iron and steel pipe, also copper and brass pipe, and the factors entering into the relative costs of piping materials. A. M. Byers Co.

323 **Handbook on Fittings, Flanges**—Catalog wf-1950, 68 pp, offers working information on seamless carbon steel welding fittings and forged steel flanges. Includes dimensional tolerances, thread standards and threading practice; service pressure, ratings, physical and chemical requirements. Grinnell Co., Inc.

324 **Welded Fittings**—Catalog 3 is a 36-pp ordering and engineering reference book on company's Weldolets for piping services. Gives data on butt-welding and socket welding Weldolets as well as on Thredolets for making threaded outlets. Typical installations are pictured; sizes, weights and prices provided. Also included are installation instructions and a technical section. Bonney Forge & Tool Works.

325 **Jacketed Piping, Cocks**—Twelve-pp Bulletin 152 discusses the special advantages, problems and requirements of jacketed piping installations and shows how manufacturer's jacketed piping, cocks, fittings and relief valves are designed to fulfill requirements. Illustrated with photos and drawings, includes specifications. Parks-Cramer Co.

326 **Aluminum Jacketing**—Economy and reduced maintenance offered by use of company's aluminum jacketing for insulated lines are stressed in illustrated Form J-1. Details fast application, corrosion protection afforded, other advantages. Step-by-step photos show how jacketing is applied. Childers Mfg. Co.

INSULATION

328 **Pipe Insulation**—Bulletin F 1-100 features on-the-job installation photographs of cellular glass insulation for pipe temperatures between —300 and 800 F. Complete listing of physical properties, condensed specifications are given. Pittsburgh Corning Corp.

329 **Insulating Material**—Ultrafine, a new thermal and acoustical insulation made of blown glass fibers, is the subject of this bulletin. Complete with photos of insulation in use and tables showing its efficiency, gives physical properties, principal uses, handling characteristics, thermal conductivity, and acoustical efficiency. Gustin-Bacon Mfg. Co.

330 **One-Coat Insulation**—This 32-pp booklet describes company's Type D insulation, a sprayed-on coating for surfaces with temperature range from —40 to 300 F. Tells how one application of this coating not only insulates but also waterproofs, rustproofs, deadens sound, prevents condensation and resists fire. Insul-Mastic Corp. of America.

331 **Improved Heat Insulation**—This 8-pp bulletin describes Super-Light 85% Magnesia

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REPLACE *them*
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✓ *Use the Angle Body and Save the Price of an Elbow Fitting*
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✓ *Operates with Finger Pressure*

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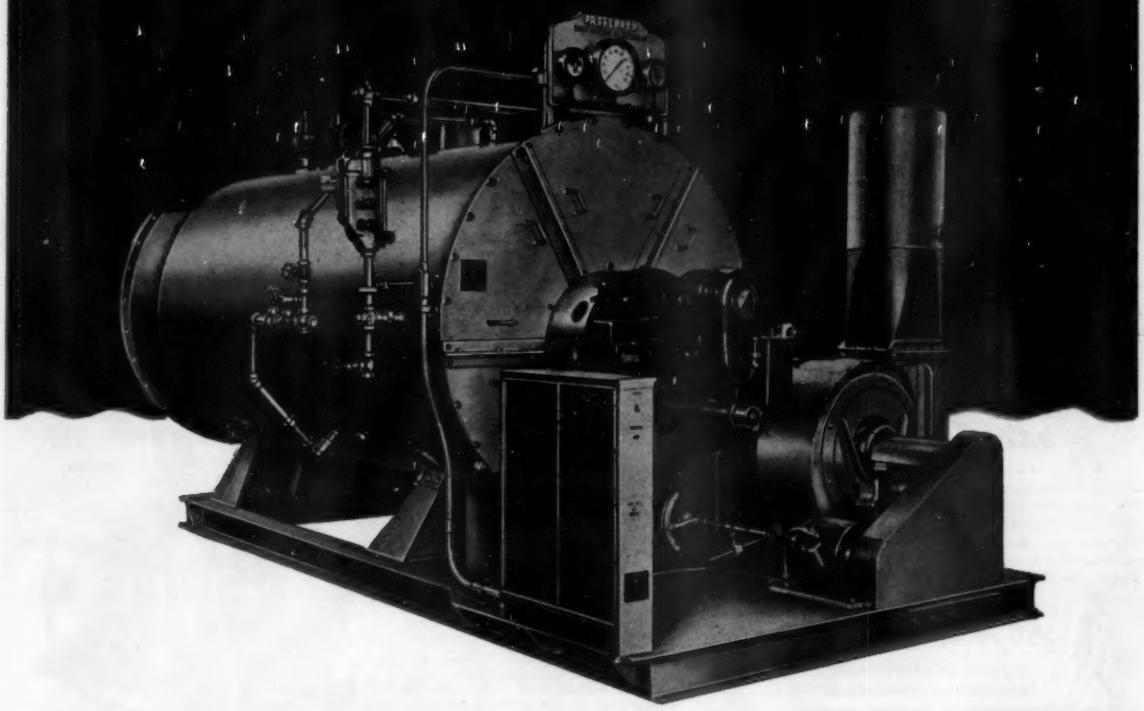

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the details of your application with the Chromalox Heating Specialist. Tell him what you want to accomplish in the way of results.

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DATA FILE

(Begins on page 218)

for temperatures to 600 F, available in cement blocks, pipe sections. Twelve advantages of this lightweight insulation are detailed. Recommended thickness, physical characteristics, prices are given. Also included is information on combination coverings with Tempchek inner layer for temperatures from 550 to 1500 F. The Philip Carey Mfg. Co.

MAINTENANCE

332 Building Maintenance—Handbook 7 offers 64 pp of information on floor surfacing, leak stoppers, external wall sealants, roadpatching, roofing materials. Includes instruction for use. Flexrock Co.

333 Proper Care of Floors—Filled with what-to-use and how-to-use-it information, this 32-pp booklet is a well written, practical text on floors. Presents floor preservation as a triple process involving cleaning, sealing and maintaining. Discusses various floor surfaces and their special problems. Gives helpful hints on floor maintenance and provides a handy chart covering preparation procedures and products for 12 common floor surfaces including cement, wood. West Disinfecting Co.

334 Cleaning Problem Solutions—Illustrated Bulletin 154, 12 pp, presents information on a wide range of cleaning methods and shows equipment available. Special emphasis is placed on the stationary vacuum cleaning system and its long-run economy in many installations. Some attachments for extending the usefulness of this versatile cleaning system are pictured. The Spencer Turbine Co.

335 Blower-Suction Cleaner—Data on a portable combination blower suction cleaner for cleaning machinery motors, stock bins are offered. Describes models available, attachments for a wide range of cleaning jobs. Clements Mfg. Co.

336 Tar Base Coatings—Now available is a collection of five bulletins on company's 100 series of cold applied tar base coatings. One bulletin gives general information on the full line and provides an application chart. The others give detailed specifications and application information on the various types. These include a coating for protection against severest corrosive conditions; a thin high gloss coating for general maintaining purposes; a coating for protection against generally severe corrosive conditions; and one for water tank interiors. Pittsburgh Coke & Chemical Co.

337 Protective Paints—Details on a rubber-base paint formulated to afford increased protection against corrosion from acids and alkalis, and especially applicable for use on concrete, are provided in this literature. These finishes are also suggested for wood and metal surfaces. Cellulose Products Dept., Hercules Powder Co.

338 Painting with Aluminum—Again made available to plant engineers is Form AD-228, 322 pp, on the use of aluminum paint. Discusses advantages of aluminum paints, describes three basic types for non-absorbent surfaces, for weather-exposed wood, and for heated surfaces and those not exposed to weather. Typical maintenance applications are covered in text and picture and practical suggestions for good results included. Use of aluminum paint on steel, galvanized metal, wood, masonry is detailed. Aluminum Company of America.

CONSTRUCTION

339 Translucent Structural Panels—Bulletin 533, 12 pp, describes Resolite, a translucent structural material, corrugated or flat, molded of thermosetting polyester resins reinforced with woven glass fibers. Illustrates use of Resolite in partitioning, skylighting and decorating installations. Provides standard sheet specifications, general information on colors, weights, light transmission, thicknesses. Resolite Corp.

340 How to Glaze with Plexiglas—Sixteen-pp Booklet PL-23 gives detailed information on glazing industrial and other buildings with

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For Servicing Hydraulic System Accumulators

Many plants now use the Cornelius Portable High Pressure Air Compressor to service central system and individual hydraulic accumulators. This compressor is entirely portable and can be moved easily to any point in the plant.

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The Cornelius Air Compressor can service individual machines requiring any accumulator pressure up to 3000 pounds per square inch. It is simple and economical to operate.

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For Pressurizing Hydraulic Accumulators and Air Cushions

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Charge Accumulators Directly with Air or Recompress Nitrogen to Usable Pressure

Two basic models with capacity of 0.6 to 2 SCFM and pressures to 3000 pounds per square inch. Largest model weighs less than 60 pounds complete with electric motor. All standard motor windings available.

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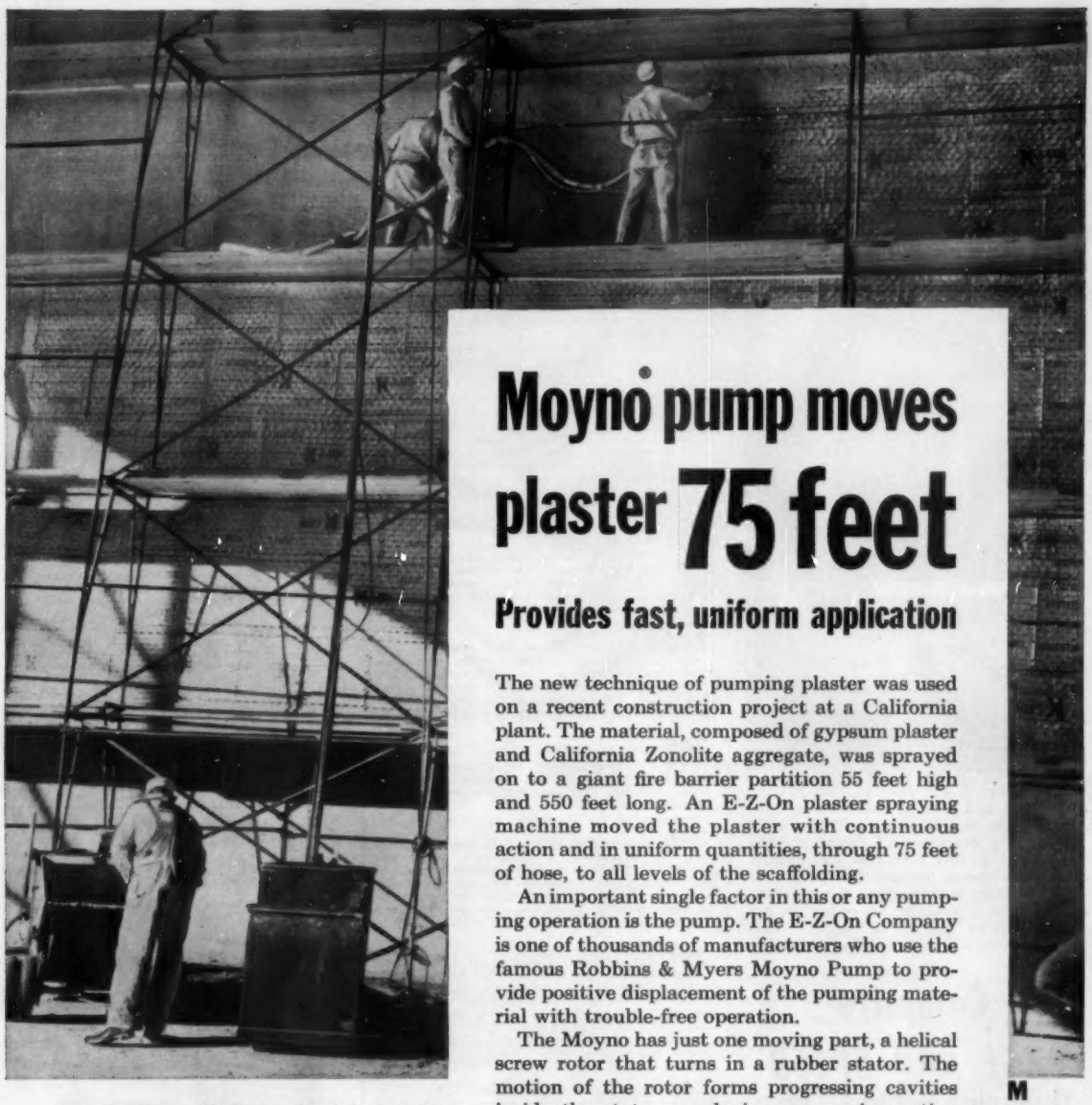


Moyno® pump moves plaster 75 feet

Provides fast, uniform application

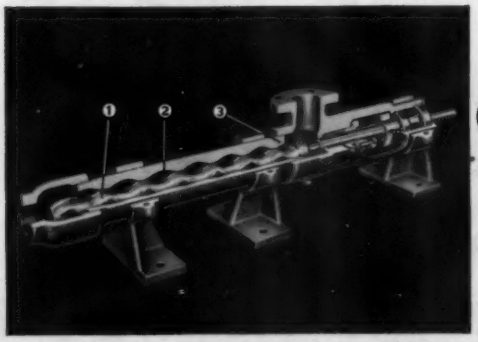
The new technique of pumping plaster was used on a recent construction project at a California plant. The material, composed of gypsum plaster and California Zonolite aggregate, was sprayed on to a giant fire barrier partition 55 feet high and 550 feet long. An E-Z-On plaster spraying machine moved the plaster with continuous action and in uniform quantities, through 75 feet of hose, to all levels of the scaffolding.

An important single factor in this or any pumping operation is the pump. The E-Z-On Company is one of thousands of manufacturers who use the famous Robbins & Myers Moyno Pump to provide positive displacement of the pumping material with trouble-free operation.

The Moyno has just one moving part, a helical screw rotor that turns in a rubber stator. The motion of the rotor forms progressing cavities inside the stator, producing a pumping action with continuous flow and positive pressure. The Moyno Pump is versatile; handles liquids, slurries, pastes, and semi-solids.

If you have a pumping problem, find out if the Moyno can help you. Write for a free copy of Bulletin 30-C-PE containing details on Moyno Pumps or ask for a pump specialist to call. Robbins & Myers, Inc., Pump Division, Springfield 99, Ohio.

How the Moyno Works: as rotor **(1)** turns, cavities **(2)** progress toward discharge end of stator **(3),** carrying pumped material. Rotor-stator contact forms progressive seal lines, insuring positive displacement. Pump is available in wide range of construction materials to handle any application.



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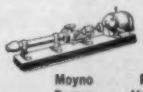
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Power Pipe Machine

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Pipe Wrenches
Power Pipe Machines
D'S FINEST PIPE TOOLS

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DATA FILE

(Begins on page 218)

flat panels of the acrylic plastic Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems. Gives properties and behavior of this sheet. Plastic Dept., Rohm & Haas Co.

341 **Glass Block Fenestration**—The natural ventilation characteristics of glass block fenestration are presented in this illustrated report of a test project. In some 88 pages, report covers sun hoods, window types, dual outlets, air speeds, double loaded ventilation below window sill. Test data is summarized and recommendations included. Although test was conducted on glass block fenestration in school buildings, the information will be of interest to those concerned with industrial applications of glass block. Kimble Glass Co.

342 **Basic Roofing Information**—"What You Should Know About Your Roof" is a 40-pp clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of a good re-roofing job, also special features of company's roofing materials. Johns-Manville.

343 **Non-Slip Flooring**—Algrip, an abrasive rolled steel floor plate described as non-slip even on steep inclines, is the subject of Booklet A-5, 8 pp. Discusses safety features; gives fabricating data, sizes, allowable loads. Alan Wood Steel Co.

344 **Steel Floor Plate**—Skid resistance and other advantages of multigrip rolled steel floor plate are stressed in this illustrated bulletin. Also gives dimensions, weights, data on allowable loads. Typical uses of the floor plate are pictured. United States Steel Corp.

345 **Industrial Doors**—Vertical lift, turnover doors, and crane doors are described as to operation and application in this 8-pp illustrated bulletin. Full specifications are provided. International Steel Co.

346 **Mobile Fire Walls**—This bulletin points out the advantage of company's Mobil fire walls. Describes three of the products designed for stopping the spread of fire within a building; fire doors, fire partitions, and non-combustible interior partitions, and presents test requirements. Virginia Metal Products Corp.

347 **For Stairway Construction**—This 12-pp illustrated booklet describes the use of this company's Junior channels in stairway construction. Provides specifications and shows some of the buildings in which the channels have been used as stair stringers. Tables give size and weights, and shows allowable loads Jones & Laughlin Steel Corp.

348 **How to Use Presdwood**—This 32-pp booklet is filled with design and construction data on Presdwood. Although much of the material presented deals with use of Presdwood in homes, the book offers suggestions of value in industrial construction and remodeling. Sections of this practical handbook cover product data, working, application information for both interior and exterior use, and specifications. Includes instructions on proper conditioning, use of adhesives, types of bends finishing, interior joints, fastenings. A table shows properties, sizes available and intended applications. Masonite Corp.

349 **Air Tools Paving Breakers**—These two bulletins describe company's latest models of paving breakers and air tools for plant construction and maintenance work. Bulletin PB1 gives features and specifications on heavy-duty, medium-weight and lightweight paving breakers, as well as tools for use with them. Bulletin ST-100 describes and gives specifications for clay spaders, trench diggers and backfill tampers. Gardner-Denver Co.

INSTRUMENTS, CONTROLS

350 **Flow Meters**—Catalog 2320, 50 pp, fully illustrated, describes all types of manufacturer's flow meters, including indicating, recording, integrating and controlling instruments of evenly graduated and square root types, as well as area meters and differential converters. Includes tables on flow approximations, installation information, factors necessary to determine if fluid to be measured can be properly handled. Industrial Div., Minneapolis-Honeywell Regulator Co.

351 **Orifice Meters**—Bulletin 1050 Rev. 1, 28 pp, shows how manufacturer's orifice meters are made, how they operate. Tables give capacity data, and there are descriptions of manifold arrangements and differential ranges, along with illustrations of various parts. Sketches show how meters are used. Rockwell Mfg. Co.

The two Reader Service Cards on pages 213-214 are easy to use and need no postage. Just circle the item number of catalogs wanted.

352 **Industrial Thermometers**—Fourteen-pp, Catalog 101 describes and pictures company's Gotham line of thermometers, including the Multi-Angle which can be rotated and tilted to practically any position. Includes temperature equivalent table. U. S. Gauge Div., American Machine and Metals, Inc.

353 **Control Centers**—Advantages of control centers and their versatility are discussed in this 28-pp booklet. Illustrated with photos and full-colored drawing, booklet shows 10 typical installations of control centers and explains how this equipment can lower costs. Design and construction features are explained, and three basic NEMA types of construction described. Electrical and mechanical construction details are shown, typical specifications provided. The Clark Controller Co.

354 **For Liquids Worth Storing**—Bulletin 6405 offers an illustrated discussion of company's self-contained gages for liquid level applications, covering both direct- and remote-reading types, also a dial type hydrostatic gage.

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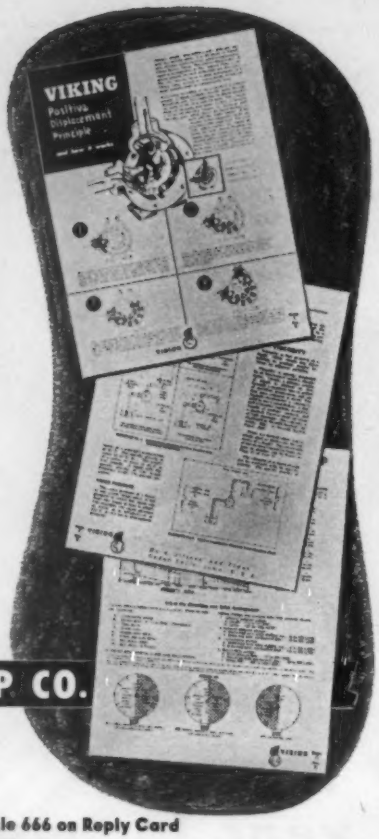

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DATA FILE

(Begins on page 218)

Stresses value of measuring stored liquids. Liquidometer Corp.

355 Wide Range Regulator—Featured in Bulletin 316 is an expansion stem type temperature regulator operated by water or compressed air. Explains how regulator works. The Powers Regulator Co.

356 Portable Brinnell Tester—A precision instrument for making standard Brinnell hardness tests, which can be carried anywhere or used as a bench tester, is described in this bulletin. Brief text covers its operation, and photos show it in use on many jobs. Advantages of the instrument are and its use in making tests are discussed. Andrew King.

357 How to Weigh Tanks—Bulletin 4106, 8 pp, explains how to weigh the contents of tanks, bins, and hoppers electronically with company's SF-4 load cells. Also covers installation design considerations such as mountings, temperature effects, corrosion protection, and vibrations. Diagrams and sketches accompany text. Baldwin-Lima Hamilton Corp.

358 Gage Glasses—Pyrex and Corning gage glasses, their dimensions and tolerances, recommended maximum working pressures, are discussed in Bulletin EG-1. Explains how to cut odd lengths of tubular gage glasses and how to install them. Technical Products Div., Corning Glass Works.

ELECTRICAL EQUIPMENT

360 Variable Speed Motors—Sixteen-pp Bulletin 1797, revised, outlines many reasons why variable speed motors can be used to improve production, and it includes illustrations of all types of company's Varidrive motors, as well as their mechanical features, remote controls; etc. U. S. Electrical Motors, Inc.

361 Motor Lubrication Tips—"To Grease or Not to Grease" is an illustrated bulletin on lubrication of ball bearing motors. Gives general information on lubricants and lubricating agents. Discusses importance of lubrication to bearing life. Also covers choice of lubricant and procedure. Wagner Electric Corp.

362 Motor Control—Company's line of relays, contactors, and starters is presented in 28-pp Catalog CS-28. Text and illustrations show greater accessibility, simplified wiring, unit construction and other design features which contribute to the easier installation, improved performance and longer service afforded. Booklet also discusses overload protection provided, and includes specifications and wiring diagrams. Cutler-Hammer, Inc.

363 FHP Manual Starters—Bulletin 224 is a folder giving the features and ratings of a line of fractional horsepower manual starters. Lists applications for them and pictures enclosures. Square D Co.

364 Motor Starters—Booklet 1062, 16 pp, describes motor starters having short circuit protection for 2200- to 5000-v systems. Illustrates starters using company's 50,000 kva interrupting capacity type HS contactor; also starters which will safely interrupt the circuit from a bus of unlimited capacity. Indoor and outdoor installations are pictured. The Electric Controller & Mfg. Co.

365 Regulated Power Equipment—Catalog 254, 32 pp, covers company's line of electronic a-c voltage regulators, regulated d-c sources and B supplies, electronic frequency changers, inverters, magnetic-amplifier d-c sources, and related equipment. Besides giving general information on the operating principles of these instruments, booklet explains reasons for regulating line voltage and advantages of electronic regulations. Sorensen & Co., Inc.

366 Battery Manual—Battery selection techniques are emphasized in 20-pp Bulletin 210, a revised edition of this manufacturer's manual on storage batteries for stand-by power, emergency lighting and switchgear applications. A discussion of charging equipment and simplified battery maintenance procedures is included.

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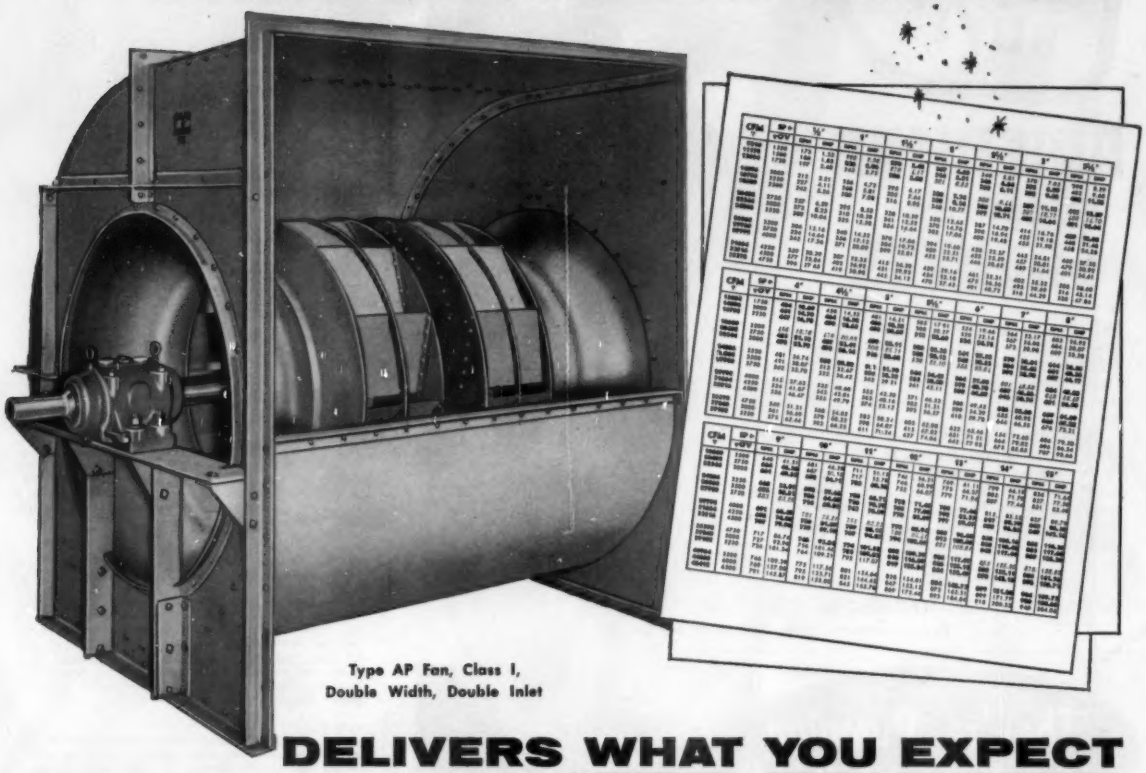

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DATA FILE

(Begins on page 218)

Storage battery installation procedures are described and illustrated by photos. Exide Industrial Div., The Electric Storage Battery Co.

367 Handbook on Storage Batteries—This 64-pp booklet of instructions and technical data is the sixth edition of this company's battery service manual. Provides a brief treatise on the theory of the lead-acid battery. Gives detailed instruction on the care and operation of batteries, on maintenance and repairs, and on standard and special parts. Booklet is of special value to plant engineers concerned with storage batteries for cycle service in industrial trucks and materials handling equipment. Gould-National Batteries, Inc.

368 Toggle Switch—Catalog 73a, 12 pp, covers 19 precision snap-action toggle assemblies and more than 90 AN and JAN approved designs, including assemblies that will control from 1 to 24 separate electrical circuits. Contains dimensions, operating characteristics, electrical ratings, contact arrangements on each switch, and an illustration of one representative switch from each group of switches. Gives general information on each "family" of switches which are designed for low voltage d-c applications. Micro Switch Div., Minneapolis-Honeywell Regulator Co.

369 Commutator, Slip Ring Maintenance—This practical little 40-pp handbook gives procedures and methods for commutator and slip ring maintenance. Generously illustrated with photos and sketches, booklet contains sections devoted to common troubles and their corrections; brushes; general maintenance; and company's products for maintenance of commutators and slip rings. Defines commutator terminology. Ideal Industries, Inc.

370 Trolley Busway Systems—Three new bulletins offer real help on electrical installations involving cranes and hoists, assembly and production lines, moving test lines and other moving electrical equipment. Bulletin 35 (28 pp) covers 225-500 amp systems; Bulletin 40 (44 pp) 100 amp systems; Bulletin 45 (40 pp) 60 amp systems. Each includes special sections on installation planning and procedure, methods of mounting and equipment descriptions. Feedrail Corp.

371 Switch Wiring Diagrams—Bulletin 709 is a 36-pp booklet of typical wiring diagrams for across-the-line starting switches. Indexed and arranged for easy use, this booklet serves as a guide to some of the many ways in which this company's manual and magnetic across-the-line starters can be applied. Some of the diagrams incorporate more than one useful feature. Includes key to electrical symbols used. Allen-Bradley Co.

372 The Answers on Wiring—"20 Questions and 20 Answers on Safety m.i. Wiring" describes and illustrates characteristics and advantages of this new wiring system. A complete table of types, sizes, weights, and lengths, as well as a partial list of users included. General Cable Corp.

373 Power and Control Cables—Sixty-pp Catalog 24 describes typical power and control cable designs and is intended as a guide in selecting proper wire and cable type. Describes insulations, sheaths and coverings, electrostatic shielding, and includes product data on all types listed. Rome Cable Corp.

374 Wire-Wound Components—Catalog R-200, a 36-pp guide to manufacturer's electronic components, describes subminiature resistors, precision and power resistors, IF and RF transformers and coils. Tables and charts give specifications. I-T-E Circuit Breaker Co.

375 Retractile Cords—This 8-pp bulletin presents retractile cords for general communication and power applications. Containing catalog data and ordering information as well as application photos, explains how the cords are made, where used, and adavntages offered. Koiled Kords, Inc.

376 Productive Maintenance—Publication GED-1691 is a pocket-size 104-pp source of information of value to plant engineers who want to get more production from their present motors, generators and control equipment. Be-

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DATA FILE

(Begins on page 218)

sides general maintenance suggestions, the booklet contains trouble shooting charts and recommended renewal parts guides. Also provides wire and cable data and includes a section of formulas and other data pertaining to motors and generators. General Electric Co.

LIGHTING, COMMUNICATION

377 Selection Data on Lighting Fixture Hangers—Catalog 50, 80 pp, contains general and detailed information on disconnecting and lowering lighting fixture hangers, accessories, special devices and parts. Utilizes 247 photos and drawings to show construction principles, operating features, installations, modifications and component parts for both indoor and outdoor units. The Thompson Electric Co.

378 Fluorescent Lighting—This 24-pp fluorescent lighting guide book is a reference digest on fluorescent products. Gives advantages of this type of lighting; summarizes various lamps and parts, including starter sockets, lampholders. Includes reference chart for lamp performance when interchanged with typical ballasts. Tabulations include seven shades of "white" lamps. Ordering details included. Sylvania Electric Products Inc.

379 Lighting Fixtures—Full information on company's fluorescent lighting fixtures designed for efficient industrial lighting and reduced maintenance is provided in Form OD-568. Day-Brite Lighting, Inc.

380 Lighting Fixtures—New Section K of Condulet Catalog 3000 describes components, performance data, and methods of relamping for any of the manufacturer's new EV series explosion-proof and weather resistant lighting fixtures. It contains illustrations showing steps for easiest relamping and installation of this type of fixture. Crouse-Hinds Co.

381 Lamp Starters—Fluorescent lamp starters, pushbutton and automatic reset types, are described in this illustrated bulletin. Points out electrical characteristics, construction and design features, and lists special advantages. Table of insured service prices is also included. Lustra Corp. of America.

382 Precision Lamps—Bulletin 40 offers application and purchasing information on various types of lamps carried by manufacturer. Flood, infra-red, spatterproof, and weatherproof lamps are briefly discussed. Radiant Lamp Corp.

383 How to Use Sound Signals—This new 44-pp combination manual, data book and catalog is an excellent reference work on industrial sound signals. Includes a simplified explanation of fundamentals of sound; a glossary of sound and signal terminology; a quick-comparison guide for selecting equipment; suggested steps in choosing a signal installation, and hints for compiling a code signal call system. Benjamin Electric Mfg. Co.

384 Television Equipment—Twenty basic applications for "TV Eye" low-cost closed circuit television equipment are described and pictured in Form 3R2335. Folder explains equipment's functions and operation, lists specifications. Radio Corp. of America.

HEATING, HEATERS

386 Forced Air Space Heaters—Illustrated Bulletin 523-B, 12 pp, is devoted to a line of forced air heaters for comfort heating, year-round ventilating, tempering make-up air, process drying and heat curing. Explains design efficiency, construction details, operating principles and flexibility of application. Advantages of the heater are detailed. Dravo Corp.

387 Unit Heaters—Bulletin 7517, 48 pp, presents full information on latest design of this company's Venturafin unit heaters for steam or hot water applications. Gives features of construction, general engineering data, capacity tables. Fully illustrated with photos of horizontal and vertical models, dimensional drawings and piping diagrams, booklet includes tips on the use and selection of unit heaters. American Blower Corp.

388 Plumbing, Heating Supplies—Edition G is the current edition of this company's 118-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and generously illustrated; gives sizes, intended uses and ordering data. J. A. Sexauer Mfg. Co., Inc.

389 Gas Heaters—How, why and when to use gas-fired unit heaters is outlined in pocket-sized Bulletin SA-541-A, 20 pp. Includes hints on heater selection and installation, schematic diagram explaining how heater works, instructions for estimating heat loss and computing gas requirements. Reznor Mfg. Co.

390 Engineering Data for Heating Systems—A great deal of helpful information on heating systems is presented in Engineering Data Manual 2695, 28 pp. Detailed illustrated information pertaining to heating problems is given. Besides covering heating terminology, there are sections on steam data, water properties, piping data, weights and measures and pipe dimensions. C. A. Dunham Co.

391 Electric Heaters—Bulletin E-1, 8 pp, describes electric unit heaters and heater sections for general industrial heating as well as for specialized use in heating corners of factories, warehouses. Illustrates overhead downward discharge heaters with revolving and stationary discharge outlets, and a heater with horizontal discharge. L. J. Wing Mfg. Co.

392 Hot Water Heating Systems—Catalog GK-954, 24 pp, features a complete line of equipment for forced hot water heating systems and chilled water cooling systems. Nine pages are devoted to information on a complete line of circulating pumps for dozens of applications. All-bronze pumps for circulating service water and silent operating centrifugal pumps for boosting water pressures are a few of the new applications. Valves, fittings, air vents, air tanks and water heaters are also described in detail. Bell & Gossett Co.

393 Electric Heat, 101 Ways—Principal industrial heating applications and methods are described in "101 Ways to Apply Electric Heat," a 32-pp booklet. Illustrated case histories show how metal-sheathed electric heating units are being used. Physical aspects of installation are detailed along with a discussion of the problem, solution and advantages obtained. To illustrate liquid heating, diagrams and photos show best applications for the elements and heaters. Similar treatment is accorded problems of heating air and gases;

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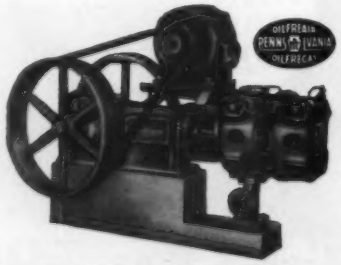

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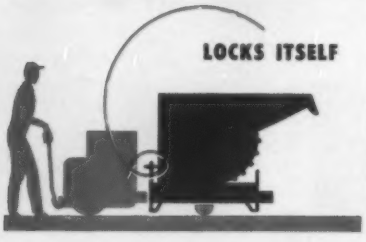

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DATA FILE

(Begins on page 218)

melting soft metals and viscous materials; and heating machinery and equipment parts. A section is devoted to far-infrared heating. Edwin L. Wiegand Co.

FANS, BLOWERS

394 **Industrial Fans**—Propellair Bulletin 650, 12 pp, contains dimensions, application, and performance data on Tubeaxial and Stack-booster fans. Gives information on cooling and drying problems, system and open surface tank ventilation. Robbins & Myers, Inc.

395 **Utility Blowers**—Dimensions, specifications, and performance data on non-overloading utility blowers with backward curved blades are presented in concise form in 48-pp Bulletin BC-11. Covers belt-drive and direct-drive models. Also company's Arrangement 2 utility blowers, and Arrangement 3 blowers available either single width, single inlet, or double width, double inlet. Hartzell Propeller Fan Co.

396 **Industrial Fan Catalog**—Of interest to plant engineers requiring quick, accurate selection of industrial fans for specified capacities, 28-pp Bulletin EX-531 contains selection tables from which correct fan for required capacity can be determined. Complete descriptive information, detailed capacity tables and dimensional data are included. Introduces a new fan offering improved efficiency. Bayley Blower Co.

VENTILATING AND AIR CONDITIONING

397 **Ventilating Equipment**—A 36-pp guide to selection of propeller fan type ventilating equipment, Catalog 151 includes specifications and installation data on company's propeller fans in portable, tubeaxial, centrifugal, roof ventilator and other types. Detailed illustrations of construction features accent design and performance factors. Case study photos show installations. Ilg Electric Ventilating Co.

398 **How Conditioning Units Can Help**—The advantages of self-contained units in cooling, dehumidifying, cleaning are cited in 40-pp Catalog 1307. Explains installation, operation. Provides data on direct expansion and cold water cooling and on hot water and steam heating. Clarage Fan Co.

399 **Air Conditioning Filters**—Bulletin 600, 8 pp, describes company's Staynew ventilation and air conditioning filters. Specifications, engineering, performance and installation data covering dry type panel filters, for the removal of air-borne impurities given. Dollinger Corp.

400 **Air Conditioning Units**—Completely revised, 32-pp Air Conditioning Catalog 7554 covers fan performance data, heating and cooling coil performance, data on filters and mixing boxes, and physical and dimensional data. Other features include typical selection examples, and specifications for company's air conditioning units. Young Radiator Co.

401 **Ventilating, Heating Equipment**—Revised Bulletin PB-290, 36 pp, describes and illustrates a line of heating, air conditioning, ventilating and heat transfer equipment. All new products, as well as existing ones with improvements are covered by text and illustration—although full information is not given on each product. Bulletin shows new large size CenTraVacs, cold generators, duplex compressors, Climate Changers, Delt-Flo fin coils and other equipment. The Trane Co.

DUST CONTROL

402 **Improved Dust Filters**—Sixteen-pp Bulletin 528-R gives information on continuous-automatic dust filters available housed or unhoused for use on pressure or vacuum. Explains principle of cleaning the filter cloth with high pressure reverse jet air, and tells where these filters are being used. Provides comparative test data on these and other type filters; discusses industrial dust control service offered and diagrams some installations.

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- Type 4 (shown above full size) holds 1/16" to ½" dia. wiring, tubing, etc. • Prices reduced
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DATA FILE

(Begins on page 218)

Self-adjusting blow rings furnished with these filters are described in detail. The Day Co.

403 **Dust Control, Blast Cleaning**—Bulletin 1210, 24 pp, fully illustrated, describes manufacturer's line of blast cleaning and dust control equipment, accessories. It is indexed according to equipment, type and purpose. Lists three methods of abrasive application. Pangborn Corp.

404 **Dust Control**—"Engineered Efficiency in Dust Collection and Recovery," 36 pp, discusses industrial dust recovery from standpoint of nuisance abatement, waste avoidance, hazard elimination. Shows effect of variation in particle size, distribution and specific gravity of dust on efficiency of the dust collecting system. Buell Engineering Co., Inc.

405 **Dust and Fume Eliminators**—Catalog 482, 12 pp, describes company's Centri-Merge dust and fume eliminators explaining advantages of the swirl action incorporated. Illustration and dimensional drawings of units with capacities ranging from 400 cfm up to 5000 to 30,000 cfm. Schmieg Industries, Inc.

406 **Dust Collectors**—Operation, construction, versatility and maintenance of company's unit dust collectors are explained in this bulletin. Includes capacities, sizes. The Kirk & Blum Mfg. Co.

PUMPS, COMPRESSORS

407 **Installing a Pump**—Blaming many pump operating troubles on improper pump selection and installation, this 8-pp technical article tells what should be taken into consideration when ordering a pump. Titled "Studying the Installation," it discusses head, viscosity, pipe friction, suction lifts, horsepower and materials. Illustrated. Viking Pump Co.

408 **Condensed Pump Data**—Form 4383-J covers more than 20 types of general service pumps, rotary pumps, sump and drainage pumps, condensate units, self-priming units, stainless steel pumps and high pressure pumps. In easy-to-find tabular form, each model is pictured along with its characteristics, applications, and features. Goulds Pumps, Inc.

409 **Data on Pumps**—This 12-pp condensed catalog covers turbine-type and centrifugal pumps for a wide range of industrial uses. Gives construction specifications, capacities, application information as well as reference to specific literature on each type. Fully illustrated. Also includes data on mixed flow pumps, sump pumps. Aurora Pump Co.

410 **For Abusive Pumping Jobs**—Catalog 4906, 36-pp, covers centrifugal pumps for wide, industrial use and especially adapted to handling ashes, abrasive mixtures, slurries, hot and corrosive liquids. It describes several basic types; a horizontal shaft, single-stage side suction pump; a horizontal shaft, single-stage, rear-entrance automatic priming pump; vertical shaft pumps with standard, overhead and quill bearings for wet pit applications. Nagle Pumps.

411 **Rotary Pumps**—This bulletin gives information and volumetric displacement specifications for heavy duty industrial pumps for tough applications, including handling paints, acids, hot varnish, paper pulp, most abrasive slurries, solvents, plastics, oils, etc. Bump Pump Co.

412 **Compressors**—Bulletin A72, 36 pp, gives construction, operation information on company's Class WN-114 heavy-duty air compressors. Illustrates seven models of compressor as a single unit for displacement capacities from 1186 to 1948 cfm, twin units furnishing up to 3896 cfm. Joy Mfg. Co.

413 **Vertical Compressors**—Double-acting, motor driven vertical compressors are described as to distinctive features, regulation available, and construction details in 16-pp illustrated Bulletin 765-5. The improved cylinder design of these compressors and valve assemblies are discussed in detail. Booklet also describes air intake filters, air receivers and aftercoolers available; and pictures some installations of the compressors. Chicago Pneumatic Tool Co.

BOILERS, GENERATORS

414 **Packaged Boilers** — This 16-pp illustrated catalog describes manufacturer's new Type TP package boiler. Following a section of background information is an outline of principal design features of these boilers, which are shop assembled and provide steam capacities from 4000 to 30,000 lb per hour. Space requirements are shown in a table along with specifications. Combustion Engineering, Inc.

To order these catalogs circle item numbers on the handy Reader Service Cards provided on pages 213-214.

415 **Steam Generators**—"Cyclonic combustion," a new method of heat transfer is discussed in this bulletin. Descriptive drawings show how air is introduced into combustion chamber at high speeds in revolving spiral vortex, radiating heat to fire tube through direct radiation and convection. Cyclotherm.

416 **Automatic Boilers** — Bulletin BE-4 describes operation and advantages of Continental automatic boiler's spinning gas technique—a method of obtaining maximum heat transfer with a simplified design. Shows cutaway view of boiler construction; illustrates hinged doors and method of injecting air through static, turbine-like vanes into burner. Boiler Engineering & Supply Co., Inc.

417 **Water Tube-Steam Generation**—Bulletin SB-51, 16 pp, discusses features of Keystone

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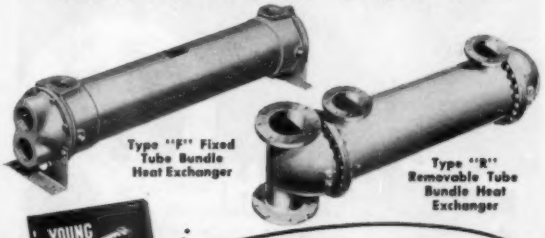

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DATA FILE

(Begins on page 218)

two-drum water tube steam generator for delivery of low cost steam. Cites advantages of conservative boiler rating (full five sq ft of heating surface for each developed horsepower), automatic controls, easy installation, fast steaming qualities, compact size. Gives specifications on all materials furnished, includes accessories. Erie City Iron Works.

OVENS, FINISHING SYSTEMS

419 Industrial Ovens — Engineering, manufacturing and installation of processing ovens are described in Bulletin D-53-20, 16 pp. Covers oven types, application to industry, source of heat, selection of heater, control of heat, distribution of heat. Photos show typical oven installations, and a complete modern finishing process is presented. Newcomb-Detroit Co.

420 Finishing Systems—Illustrated Catalog A-653, 12 pp, describes complete finishing systems for porcelain and synthetic enamel, lacquer, paint, and other finishing. Also covers a variety of other industrial equipment including ovens, dust collectors and fog filters. The R. C. Mahon Co.

421 Industrial Ovens — Thirteen types of company's Convectioneered ovens, which apply principles of forced convection heating to various industrial processes, are illustrated and described in 12-pp Bulletin 200. These ovens serve foundries, metal finishers, plastics producers. The W. W. Sly Mfg. Co.

WATER CONDITIONING

422 Feedwater Treating—Bulletin 1855, 30 pp, features manufacturer's hot process Accelerator for treatment of boiler feedwater, illustrating and explaining its operation and advantages, optional equipment. Contains excellent discussion of necessity for treatment of makeup water, selection of proper equipment. Also covers the limitations of hot process softening. Infilco Inc.

423 Testing Equipment—Designed for use as a guide in the selection of water testing equipment, this 12-pp bulletin describes complete line of titration stands and tests for hardness, alkalinity, chloride, sulfide, etc.; cabinets and test set for similar tests; Conducto Bridge for determination of specific conductance of water solutions, colorimetric comparators; and the photometer for water analyses. W. H. & L. D. Betz.

424 Chemical Control and Testing — The need for intelligent chemical control and testing to assure the success of a water conditioning program is described in this 6-pp pocket-sized folder. Emphasizes need for explicit control limits and chemical tests to show that these limits are being met, and the proper technical skill required to prescribe these limits. Hall Laboratories, Inc.

MATERIALS HANDLING

425 Electric Hoist Manual—Catalog 215-B offers 38 pp of engineering, application and ordering information on company's Load Lifter electric hoists. Presents hoists with hand operated trolleys and with power travel, hoists with lug suspension, hook suspension and push-type trolleys, and with hand-geared trolleys, hoists for low head. Manning, Maxwell & Moore, Inc.

426 Overhead Handling Equipment—Booklet 2008-K, 12 pp, is the current edition of this company's engineering and application data booklet covering overhead materials handling equipment. Describes and illustrates track drives, cranes, electrification, buckets, grabs. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

427 Electric Hoists—Twelve-pp Bulletin DH 133B describes Speedway electric hoists of 500- to 4000-lb capacities. Fully illustrates and explains design features and gives details on suspensions and conductor systems. Clearance data, specifications included. Wright Hoist Div., American Chain & Cable Co., Inc.

428 Cranes for Big Jobs—A new 1½-yard shovel, 35-ton crane is described in this 6-pp catalog. Action pictures of the machine in quarries and gravel plants are included, also specifications. American Hoist & Derrick Co.

429 How to Choose a Crane—Designed to aid in the selection of overhead cranes, 8-pp Unit 97 shows how to analyze handling problems, decide on the type of crane desired and draw up specifications for crane proposals. Basic data is provided on classes of crane service, crane ratings and capacities and recommended speeds for bridge, trolley and hoist, along with standard dimensions and clearances. Gives 14 safety features; also information on motors, controls. Whiting Corp.

430 Manual on Electric Hoists — Catalog H-46, 40 pp, covers monorail and stationary hoists and car pulleys. Explains fundamental types of grabs, methods of hanging I-beams, types of hoist suspension, controls. American Engineering Co.

431 Overhead Cranes — Sixteen-pp Bulletin U-200 presents underhung overhead cranes of the push type, hand geared type and motor driven type. Fully illustrated with photos of cranes and typical installations, book provides application suggestions and full dimensional data. Also covers track hangers, tracks and trolleys. Chicago Tramrail Corp.

432 Floor Cranes — 1954 models of this manufacturer's hydraulic floor cranes are described and pictured in the 8-pp bulletin. Shows cranes from 1000- to 6000-lb capacities, giving applications and special features of each. Ruger Equipment, Inc.

433 Skip Hoists — Sixteen-pp Bulletin 110 provides sequence views of operation of weigh type and plug feed loading gates. Lists capacities of various size buckets, traveling various lifts at various speeds. Describes hoist engines, sheaves, head frames and counterweights. The C. O. Bartlett & Snow Co.

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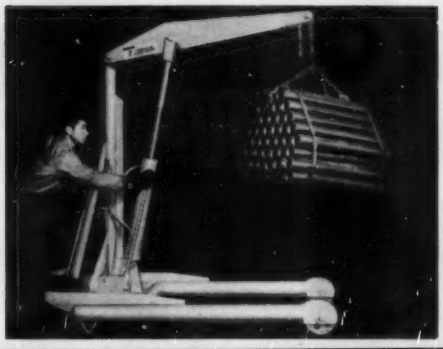

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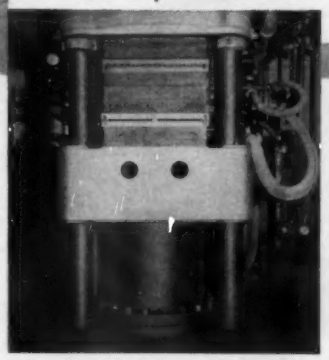

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DATA FILE

(Begins on page 218)

434 Conveying Equipment — Sixteen-pp Catalog GC-53 contains photos, specifications and application suggestions on portable and permanent-type belt units, gravity wheel and roller conveyors in steel and lightweight aluminum, and industrial casters and hand trucks. Shows how this conveying equipment can be used to fit individual handling problems. The Rapids-Standard Co., Inc.

435 Conveyor and Elevator Belting Tips—This 32-pp manual on installation, maintenance and care of conveyor and elevator belting, uses photos and drawings to show ways to improve belt service and lengthen belt life. Includes a discussion of belt design, covers, reinforcements and grades. Repair methods, splicing, and fastenings are also covered, and there's a table listing common conveyor belt maintenance problems with their cause and remedies. The B. F. Goodrich Co.

436 Conveyor Belting — Folder 54-3, contains a capsule description of construction, types of treated stitched canvas belting for all conveying and elevating appplications. Describes company's general conveyor and elevator belt, oil- and acid-resisting belts to handle hot materials to 600 F. Imperial Belting Co.

437 Oilless Bearings for Conveyors—Technical Catalog 210, 20 pp, gives detailed information for specifying, installing and use of bearings for screw and roller conveyors, together with operating characteristics. The sectionalized catalog provides tabular data and dimensional drawings to facilitate identification of bearings for replacement. Arguto Oilless Bearing Co.

438 Continuous Power Conveyor — Sixteen-pp Catalog A-96 describes a packaged overhead conveyor for light duty applications. This complete basic "package" contains drive unit, take-up, oiler and other items essential for a 50-ft system. Describes power drive unit, track, power chain and other components and discusses lubrication and chain safeguards. Suggested layouts are diagrammed, and some installations of these conveyors are illustrated. Richards-Wilcox Mfg. Co.

439 Conveyor Trolleys — A new line of ball bearing trolleys for overhead conveyors is covered in 20-pp Book 2536. Contains specification data for the selection of new trolleys, or of replacement trolleys for existing installations. Describes many features resulting in low operating and maintenance cost, such as ball bearings with ground raceways, and machined and hardened treads. Includes application and maintenance information and a description of attachments commonly used. Link-Belt Co.

440 How to Pick a Truck — Catalog 54, 8 pp, features a step-by-step procedure for making the best fork truck choice for a particular handling job. Other sections in the booklet show at a glance complete specifications on each of company's trucks, and illustrates important construction and design features. The Baker-Raulang Co.

441 Pickup Trucks—Electric pickup trucks for a wide range of transportation and hauling jobs are described in an illustrated folder. Stresses their economical operation and minimum maintenance. Gives specifications of a ¼-ton model and a ½-ton flat-bed truck. Autoette.

442 Lift Truck Work Kit — A method of predetermining the time necessary for fork lift trucks to perform specific operations is provided in this work kit, designed to enable plant engineers to apply fork lift truck standard performance data. It can assist in determining efficiency of fork lift trucks now in use as well as in planning for future needs. Includes typical materials handling examples to show technique for application of the data as well as charts providing times for basic truck motion elements. The Yale & Towne Mfg. Co.

443 Fork Truck Efficiency Test—This 8-pp article explains how to tell when fork trucks need corrective measures. Lists equipment and facilities necessary for truck testing, tells how to test traveling efficiency and hoist speed measurements, shows suggested test data forms. Mercury Mfg. Co.

444 Hydraulic Lifters — Standard Products Bulletin 54, 12 pp, features new Worklifters portable, battery-operated, hydraulic lifters available in a variety of special purpose designs, in a 1000 lb capacity, and with lifts up to 80 in. Also describes company's Shoplifters with both hand powered and electric hoisting units, and with accessories for die handling, or designed for handling drums. Economy Engineering Co.

445 Industrial Lifts—This booklet presents a wide range of elevating equipment designed to step up efficiency and cut handling costs. Covers dock lifts, crossover bridges, sidewalk elevators, service lift. The Wayne Pump Co.

446 Transit Crane—Twelve-pp Bulletin 15-B-TC-1 describes a transit crane of 15-ton capacity. Illustrated by job application photos and closeups of mechanical features, the booklet includes a list of specifications and working ranges, plus brief, easy-to-read description of the machines advantages. Bucyrus-Erie Co.

447 For Hopper Economy—"In Dollars and Sense" explains long run economy of company's self-dumping hoppers, showing how they operate and telling how they fit particular plant requirements. Illustrated with photos, gives dimensions, weight of a standard 1-yd model. Roura Iron Works.

WIRE ROPE, SLINGS

448 To Keep Wire Rope at Work—Form 3547 is an 82-pp handbook titled: "Here's How to Keep Your Wire Rope Working," and filled with practical tips on care and use of wire rope. Tells how wire rope is constructed, what types are suited to various jobs, how to install it. Covers such subjects as abrasion, lubrication, avoiding kinks, alignment of sheaves, winding on drums, bending fatigue, wire breaks,

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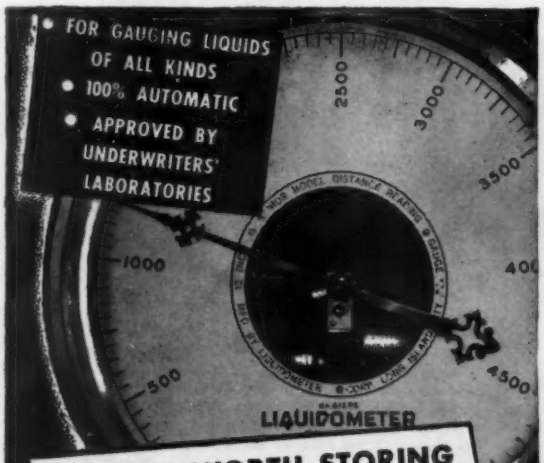

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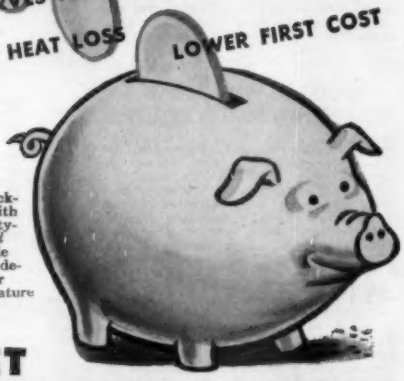

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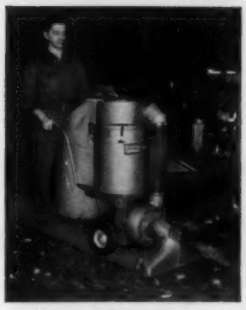

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DATA FILE

(Begins on page 218)

when to discard a wire rope. Wire Rope Div., American Chain & Cable Co., Inc.

449 Wire Rope Assemblies — Catalog 5201, 22-pp, describes company's wire rope assemblies, used for operating controls, as a part of machinery and equipment, or for slings and hoists. Gives general applications for various types of wire rope assemblies, and includes specifications, ordering details. Macwhyte Co.

451 Sling Chain Handbook—Illustrated Data Book 100, 32-pp, presents "how to do it" information on sling chains—from ordering to care, use and inspection. Contains diagrams, charts and tables on standard and special styles of sling chains and attachments, and their sizes, weights, and working load limits under many conditions. Columbus McKinnon Chain Corp.

TOOLS, WELDING AND MACHINE SHOP EQUIPMENT

452 Where to Use Your Stud Driver — Twenty-pp pocket-size Form 955 describes and pictures applications of studs, using company's Model 450 stud driver. Provides some operating hints and safety precautions and covers use of studs through steel into concrete, wood into concrete, wood into steel and steel into steel, as well as their use for attachment of pre-drilled fixtures. Remington Arms Co., Inc.

453 Data for the Shop—"Fluids and Facts for Metal Working" is a pocket-size booklet of about 44 pp. A section on metal working fluids covers their function and selection, preparation and use of soluble oils and paste compounds, and prevention of dermatitis. A section on metal working facts gives conversion tables, steel numbering systems, machinability ratings of metals, drill grinding charts, twist drill sizes and other data. Booklet also includes product data on industrial oils, machine tool lubricants, greases, quenching and tempering oils. Standard Oil Co. (Ind.)

455 Welding Positioners — Fully illustrated, 16-pp Bulletin P1-2 outlines important features and gives condensed specifications on four welding positioners with capacities to 35,000 lb. An efficiency graph based on typical welding jobs provides a quick picture of production advantage. Welding Div., Harnischfeger Corp.

457 Metal Quenching—Valuable information on the quenching of metals is available in this 24-pp booklet. It is illustrated with charts and graphs depicting cooling curves, cooling rates, effect of bath temperatures, agitation curves, hardness penetration curves, and transformation diagrams. Contains a series of typical case studies which detail the solution to some tough quenching problems. Gulf Oil Corp.

458 Metal Spraying Gun—Company's Type 4E gun for high-speed spraying with all metals is described in Bulletin 94. A cutaway drawing shows construction features of the gun which is designed for tool-postmounting or hand operation. Metallizing Engineering Co., Inc.

459 Improved Quenching Oil — A new quenching oil with thermal stability and high boiling range, particularly suitable for quenching systems requiring a high flash-point, is described in Form A-3073. Discusses advantages of this quenching oil and includes specifications. Sun Oil Co.

460 Machines for Special Products — This 12-pp catalog lists company's machine tools and other metal fabricating, forming, treating and processing equipment which is now available for contract manufacturing. Types, quantities and operational dimensions of the facilities are included. The Jeffrey Mfg. Co.

VIBRATION CONTROL

461 Engineered Vibration Control—Bulletin 104 presents spring, cork and rubber mountings, discusses advantages of each and use alone or in combinations. Provides helpful selection chart covering a wide range of machines, showing recommended and alternate methods of isolation. The Korfund Co.

462 Improved Machine Mounts—This brochure describes advantages of company's leveling machine mounts. Tells how they enable installation and leveling of heavy machines without bolting or shims, afford increased plant mobility, reduce maintenance costs, and lessen noise. The Barry Corp.

463 Facts on Machine Anchoring — Case histories on use of this company's Unisorb for machine installations are told and illustrated in this 24-pp booklet. They cover metalworking plants, food processing plants, printing plants, others. Also included are test data on vibration and the use of felt. The Felters Co.

MECHANICAL POWER TRANSMISSION

465 Flexible Couplings — Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings. Tells advantages of these couplings and discusses design principles. Double-flexing and floating shaft types, light duty couplings and types for special applications are described and pictured in detail. Thomas Flexible Coupling Co.

466 Roller Chains, Sprockets—Catalog 754, 64 pp, describes, illustrates a line of roller chain stock sprockets, including minimum bore sprockets for reboring, also finished bore and Taper-lock bushed sprockets which are ready to use. Tables show speed ratios for sprocket combinations, standard keyways and setscrews. Includes chain selection and application data, installation and lubrication recommendations, chain length calculations, dimensions and price lists for single and multiple strand roller chains. Diamond Chain Co.

467 Sprocket Roller Chain—Bulletin A-624 24 pp, is compiled to provide plant engineers

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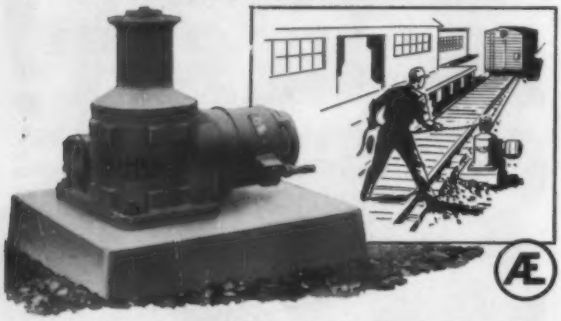

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3. puts a load of 3000 kg. on a 10 mm ball—other loads as required
4. can test materials in any position almost anywhere — even small cramped spaces
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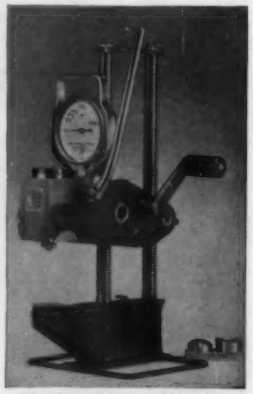
7. is especially adapted for testing immovable parts and parts in assembled machines

Ask for the folder illustrating and describing other advantages of this widely used precision tester.



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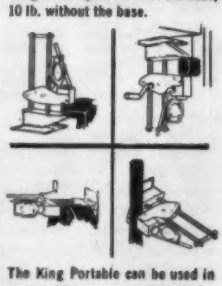

The King Portable can be used in any position—even upside down.

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DATA FILE

(Begins on page 218)

with all data required for selecting and ordering roller chain and sprockets. Devotes a page to Taper-Lock sprockets for each size of chain from 40 to 100, giving sectional drawing, dimensions, number of teeth, maximum stock bore available, weights, prices and other data. Another page covers Taper Lock bushings; and full information is given on riveted and cotter-type roller chains. Dodge Mfg. Co.

468 Fluid Couplings—Bulletin 144-D, 14-pp, presents complete installation and performance data on fluid couplings. Illustrated with diagrams and drawings, bulletin shows ease of applying company's fluid couplings on any type industrial equipment, powered by any type electric motor or internal combustion engine from ¾, to 850 hp. Describes standard models providing standard input, output combinations, and standard models in packaged units. Installation hook-ups are given, along with typical applications. Twin Disc Clutch Co.

470 Shaft Mounted Drives—Plant Engineers who use machines requiring input speeds between 420 and 10 rpm in the range between ½ and 30 hp, will be interested in 8-pp Bulletin 7101. Contains complete information—design data, selection tables, dimensions, weights, installation photos—on this modern type of standard gear drive designed for high ratios of speed reduction in limited space, with savings in initial and installation costs. The Falk Corp.

OTHER EQUIPMENT

471 Improved Hose Coupling — A quick connect-disconnect hose coupling for water, oil, steam, gas and chemical lines is described in this 16-pp bulletin. Describes the coupling's construction and explains how it provides a sealing action which makes the coupling tighter as internal pressure increases, and a full swiveling action that prevents hose twisting and kinking. Titeflex, Inc.

472 Fire Extinguisher—How to extinguish a fire in 11 sec by use of the Fyr-Fyter instant extinguisher with "loaded stream" chemical liquid, "Karbaloy," is pictured in Bulletin F-1158. Lists advantages of 500 lb stainless steel model. The Fyr-Fyter Co.

473 High Temperature Thread Compound—The advantages of company's thread compound for use in high temperatures are outlined in this informative pamphlet. Lists chemical properties, describes application and function, and offers comparison data on performance of this compound. Felt Products Mfg. Co

474 Neoprene Design Book—This illustrated bulletin discusses the properties of Neoprene, showing how they are utilized in products made from this chemical rubber. Covers its toughness, hardness range, air retention, performance under load, at extreme temperatures, flame and chemical resistance. Rubber Chemicals Div., E. I. du Pont de Nemours & Co.

476 Large Capacity Condenser — Bulletin 123 describes the 400-ton capacity Aeropass condenser and fluid cooler. Explains and illustrates operating principles of the unit. Lists benefits offered for large liquid cooling and condensing applications. Niagara Blower Co.

477 Epoxy Resin Compounds — This 16-pp booklet describes the use of epoxy resins for tools, dies, jigs, fixtures, adhesives, laminating, casting, potting, embedding, and encapsulating. A special section is appended on release agents for molds. Data on storage life and handling of the epoxy resin compounds, their working life, mixing, fillers and cleaning equipment are explained. Bakelite Co., Div., Union Carbide and Carbon Corp.

478 Combination Burners—Bulletin 176 describes and illustrates fully automatic oil-gas burners of the horizontal rotary-nozzle mix type designed to permit instant change from one fuel to another. Gives design details and electrical characteristics, includes specifications. Also presents an extension front for conversion installation. Preferred Utilities Mfg. Co.

479 Magnetic Selection Guide — Twelve-pp illustrated Catalog of C-5000-B, describing manufacturer's entire line of magnetic separators and lighting magnets, serves as handy guide to the selection of magnets. Dings Magnetic Separator Co.

480 Filter Fabric Facts—This 16-pp illustrated booklet contains information about filtration principles; filtering devices; filter media; textile fibers for filtration; a comprehensive chart on chemical and heat resistance of cotton and synthetic fabrics; sections on yarns, fabrics construction and finishing; and a round-up of filter fabrics in use. Photos illustrate variety of filter fabrics being produced for industrial use. Wellington Sears Co.

481 Doors, Operators — This bulletin describes a line of doors and electric operators and controls for commercial and industrial uses. Details of construction and operation are given, as well as specifications and information on various materials of construction. Overhead Door Corp.

483 Gas-Butane-Gasoline Engines — Eight-page Bulletin E-7 describes and illustrates 225- to 675-hp engines. Cutaway views and photos point out design features and charts showing space savings in design and horsepower ratings at varying rpm's are included. Lists basic specifications, areas of application. Le Roi Div., Westinghouse Air Brake Co.

484 Catalytic Exhausts — This bulletin describes OCM catalytic exhausts designed to remove harmful exhaust fumes from internal combustion engines burning diesel, LPG or non-leaded gasoline. Lists in-plant equipment (portable welders, stationary engines, etc.) as types benefiting from these exhausts. Oxy-Catalyst, Inc.

485 Why Liquid Chillers — Advantages of company's packaged liquid chillers are outlined in this 16-pp illustrated bulletin. Pictorially and graphically illustrated, the bulletin gives specifications, dimensions and applications of variously sized liquid chillers. Provides charts listing physical data. Worthington Corp.

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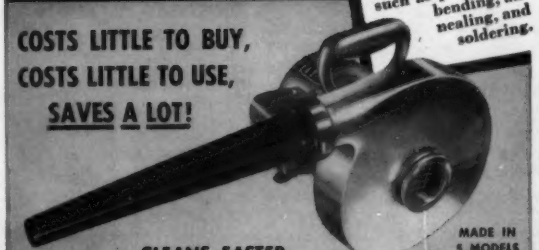

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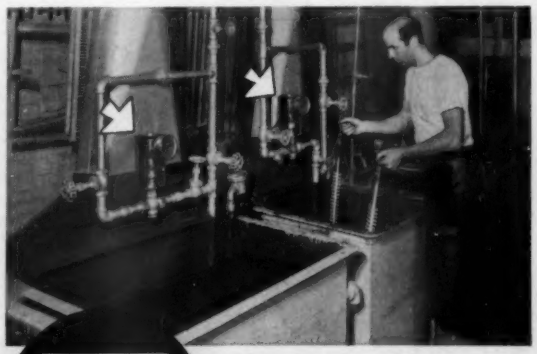

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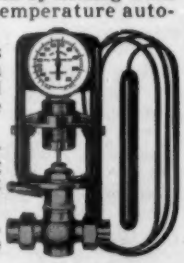

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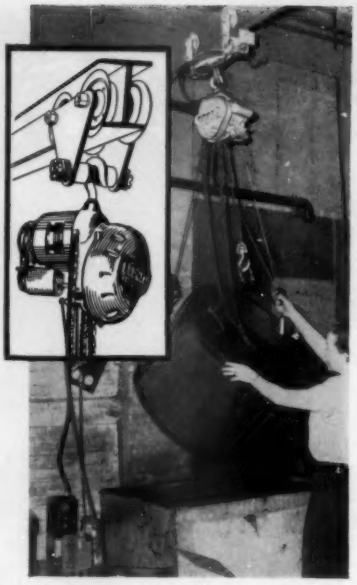

SMALL HOIST
BIG SAVINGS

Load-handling costs tumble wherever the 'Budgit' Electric Hoist is on the job. It is a complete, portable hoist. You get powerful lifting action at the pull of a convenient control cord. It's a fast hoist — the ¼-ton 'Budgit' lifts the full load a foot in less than two seconds! Operates all day on just a few cents' worth of electricity. It steps up production efficiency and economy. Man, load, and hoist are protected by built-in safeguards.

The powerful 'Budgit' comes ready to hang up, plug in and use. No accessories to buy. No installation costs. Capacities: 250 to 4,000 lbs. AC and DC models. Prices start at $139. Get complete details of construction that assure long service and freedom from costly maintenance. Send for Bulletin 391.

***'BUDGIT' CORD REELS** increase the operating range of any make electric hoist, portable tool, or mobile device with a motor up to 1 HP. Cable leads off in all directions.*

MAXWELL MANNING MM&M MOORE

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ELECTRIC HOISTS

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' and 'American-Microsen' Industrial Instruments, and Aircraft Products.

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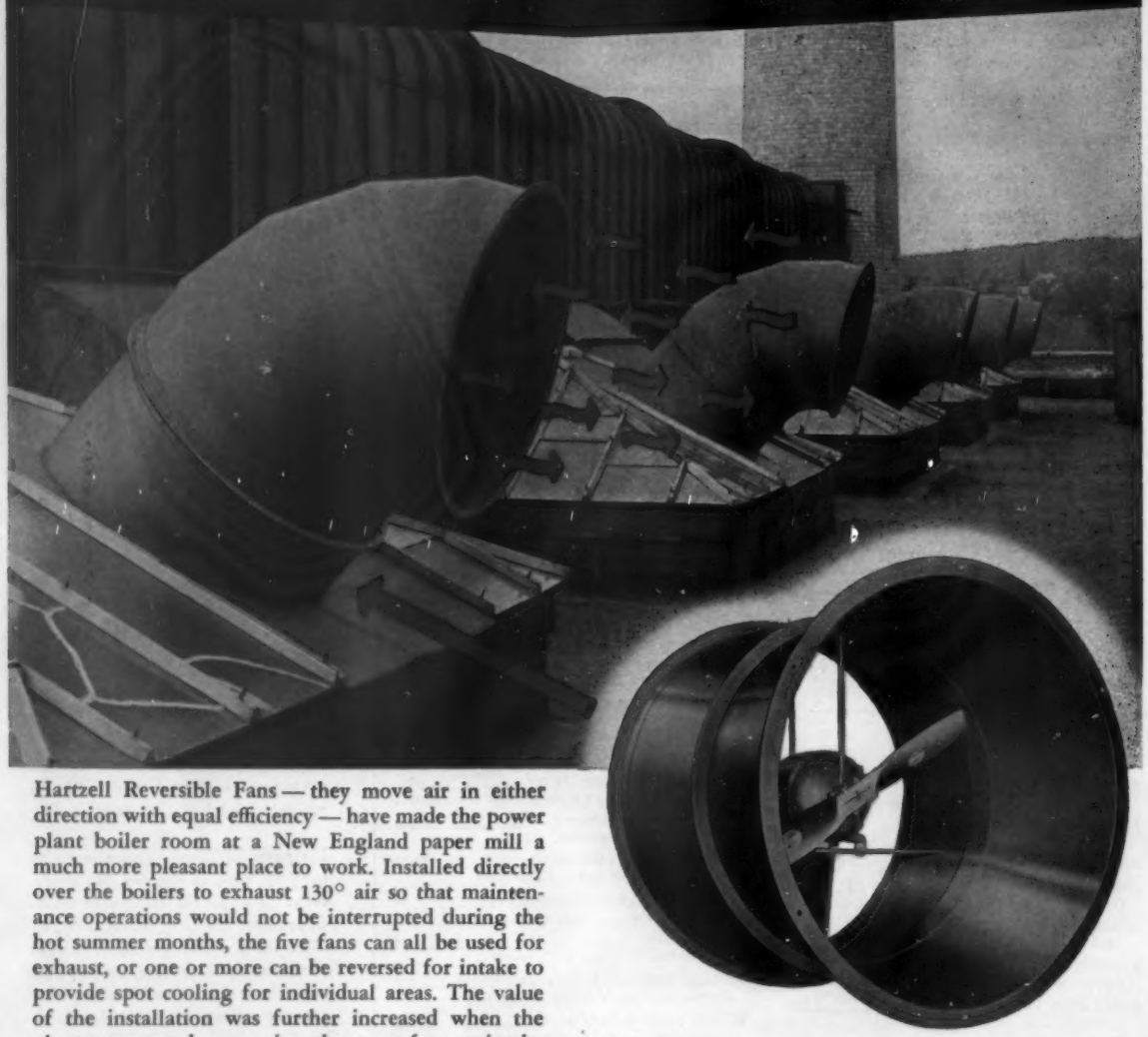
Hartzell *Reversible* Fans carry a double burden in the power plant at this New England paper mill



Hartzell Reversible Fans — they move air in either direction with equal efficiency — have made the power plant boiler room at a New England paper mill a much more pleasant place to work. Installed directly over the boilers to exhaust 130° air so that maintenance operations would not be interrupted during the hot summer months, the five fans can all be used for exhaust, or one or more can be reversed for intake to provide spot cooling for individual areas. The value of the installation was further increased when the plant operators began using the same fans as intake units during the winter. In this application, outside air — preheated by blowing over the boiler casings — provided fresh air for the room and additional combustion air for the boilers.

A simple installation, sure. But it took a special fan to make it work—the versatile Hartzell reversible fan. Simple answers to tough industrial air-moving jobs are a Hartzell specialty. Your nearby Hartzell field engineer has the "know-how," and the equipment, to help you solve your toughest ones. Be sure to give him a call the next time you have any air-moving problem.

This installation was handled by the Hartzell field office at 4 Einhorn Road, Worchester, Mass., phone 6-2056.

HARTZELL *propeller fan co.*

Div. of Castle Hills Corp.

Dept. S

PIQUA, OHIO

ENGINEERING OFFICES IN PRINCIPAL CITIES

PROPELLER-TYPE FANS • BLOWERS
ROOF VENTILATORS • UNIT HEATERS

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Reinforcing Rod Plant UPS PRODUCTION 300%

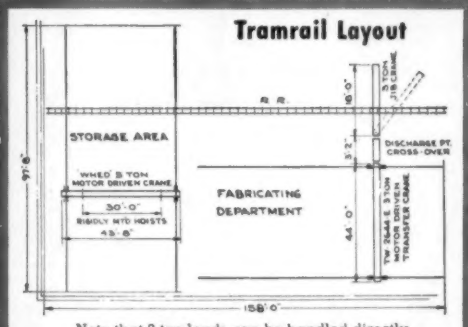
Cleveland Tramrail System Pays For Itself In 6 Months

AFTER a reinforcing rod plant built a new building and equipped it with Cleveland Tramrail cranes, manufacturing costs took such a nose dive that they would make any cost-conscious plant manager blink with amazement.

Whereas eight men were required to work 8 hours to unload a 50-ton car of rods in the old building, two men using Tramrail cranes now do the job in 30 minutes. The Tramrail equipment has enabled doubling the production, and at the same time reducing man-hours by one-half. In other words, the production per man-hour is four times what it formerly was.

The savings have been so phenomenal that the entire Tramrail system was paid for in the first six months of operation.

Nearly every industry is securing important advantages with Cleveland Tramrail equipment. A nearby Tramrail sales engineer will gladly suggest ways that savings can be made in your plant.



Note that 3-ton loads can be handled directly between jib crane and 3-ton transfer crane.

5-ton crane handles 60'-0" long bundles of rod from railroad car to storage and to shear.

Outgoing truck is quickly loaded with 3-ton crane.

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BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

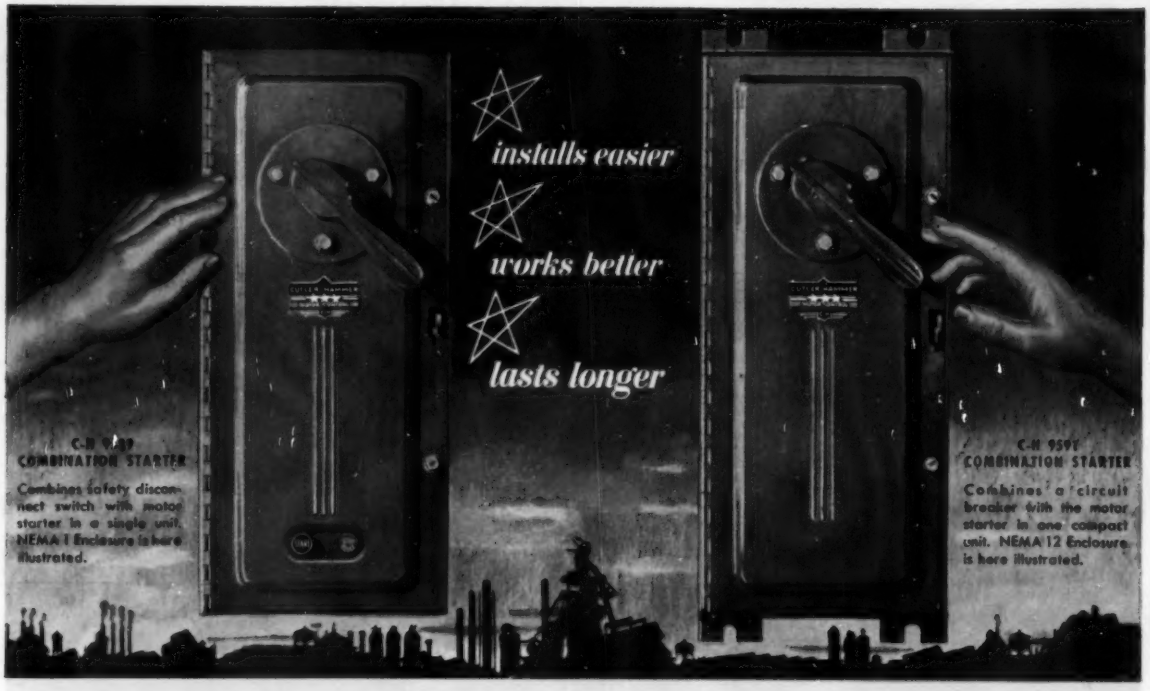
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7503 East 290th Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

For more facts circle 703 on Reply Card

WHAT'S NEW IN MOTOR CONTROL? ★ ★ ★ GET IT FIRST IN CUTLER-HAMMER

New Combination Starters in the Spectacular Line of Cutler-Hammer ★★★ Motor Control

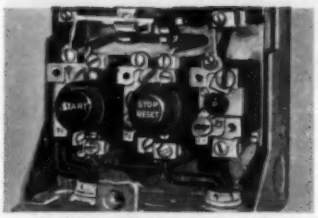

installs easier
works better
lasts longer
C-H 9589
COMBINATION STARTER
Combines safety disconnect switch with motor starter in a single unit. NEMA 1 Enclosure is here illustrated.
C-H 9591
COMBINATION STARTER
Combines a circuit breaker with the motor starter in one compact unit. NEMA 12 Enclosure is here illustrated.

Users have had many dramatic proofs of the advantages built into Cutler-Hammer ★ ★ ★ Motor Control. They *know* the three silver stars on the Cutler-Hammer nameplate identify control equipment that sets three entirely new standards of motor control performance and value.
Star #1: Amazing savings in installation costs which often exceed the cost of the control.
Star #2: Performance so uniform and dependable that *this* control often saves many times its cost by the production interruptions it avoids.
Star #3: Life so greatly increased that this control *never* requires maintenance expense in 90% of its uses.

Now combination starters are available in this spectacular new line of Cutler-Hammer ★ ★ ★ Motor Control. Your nearby Cutler-Hammer Authorized Distributor has been stocked and is ready to serve you. Bulletin 9589 Starters incorporate a rugged disconnect switch of advanced design with or without fuses. Bulletin 9591 Starters are equipped with circuit breakers. Order *now* for prompt delivery.

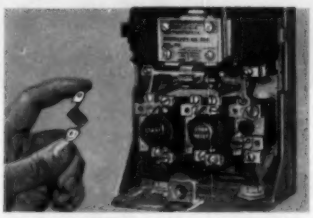
CUTLER-HAMMER, Inc.,
1447 St. Paul Avenue, Milwaukee 1, Wisconsin.

CUTLER-HAMMER
★ ★ ★
MOTOR CONTROL
C-H



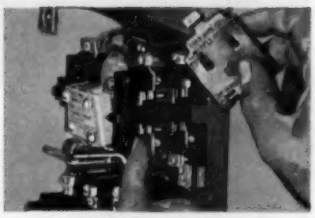
Full Three-Phase Protection

Only three overload relays can give complete three-phase protection to avoid motor burn-outs and their costly interruptions to production. And only Cutler-Hammer offers this complete three-phase protection in standard combination starters. You pay only for the third relay, nothing extra for special engineering or special enclosures.



Adjustable Load Sensing Coils

The accurate adjustment of overload protection permits motors to work harder without damage to motor windings. This is more important than ever with the newer type small frame motors. Adjustable load sensing coils in these new starters provide 3% loading accuracy instead of the 10% to 12% accuracy in competitive control.



Superlife Vertical Contacts

Experienced control users insist on dust-safe vertical contacts. And now the famous Cutler-Hammer vertical contacts have been doubly improved. First, their new lightweight design cuts bounce to reduce arcing. Second, any arcing that might occur is now pressure-quenched. Compare performance and see the difference.

For more facts circle 704 on Reply Card

MAY, 1955

Plant Engineering

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The magazine that helps plant engineers with their everyday problems